

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

**TO:** John Mitnik, Chief, Engineering and Construction Bureau  
Paul Linton, Administrator, Water Control Operations Section

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** October 18, 2016

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

Breezy with showers east. An upper level low east of the Bahamas has a trough extending through the Bahamas and eastern Cuba and this system is helping to develop a surface low east of the Bahamas. Sinking air on the backside of this trough should limit shower coverage over the District but scattered light shower activity should move on shore along the east coast today and this evening. The surface low east of the Bahamas should move slowly northward Wednesday and Thursday and bring an increase in shower activity east Wednesday night and Thursday. A cold front is forecast to move through the area Friday night and Saturday morning bringing light to moderate shower activity followed by dry and a little cooler conditions Saturday night and Sunday.

#### **Kissimmee**

On Sunday, stage in East Lake Toho, Lake Toho, and Kissimmee-Cypress-Hatchineha was above schedule by 0.3, 0.1, and 0.7 feet, respectively. Over the past week, discharge at S65, S65A, and S65E averaged 1,131, 1,570, and 3,553 cfs, respectively. Tuesday morning discharges were ~1,246 cfs, ~1,398 cfs, ~2,373 cfs, and ~2,606 cfs, respectively at S65, S65A, S65C, and S65E. Dissolved oxygen in the Kissimmee River averaged 3.38 mg/L over the past week. Kissimmee River mean floodplain depth on Sunday was 1.05 feet. A temporary reduction in discharge at S65A to 700 cfs following the discharge ramp down schedule in Figure 8a should facilitate back filling of the MacArthur Ditch .

#### **Lake Okeechobee**

Lake stage has fallen 0.11 feet over the past week and is currently in the Low sub-band. Lake stage remains above the top of the preferred stage envelope (15.5 feet NGVD). Field crews are out checking the status of the submerged aquatic vegetation community this week.

#### **Estuaries**

Total discharge to the St. Lucie estuary averaged 2,677 cfs over the past week with 703 cfs (26%) coming from Lake Okeechobee. The seven-day average salinity at the US1 Bridge continues to be in the poor range for adult oysters. Total inflow to the Caloosahatchee estuary averaged 6,526 cfs over the past week with 5,120 cfs (78%) coming from the Lake. Salinity conditions are good for tape grass in the upper estuary. Salinity conditions are good for adult oysters at the Sanibel Causeway and Shellpoint, but in the poor range at the Cape Coral Bridge.

#### **Stormwater Treatment Areas**

Over the past week, the STAs/FEBs received no Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2017 (since May 1, 2016) is approximately 71,600

acre-feet. All STA cells are at or above target depths. Operational restrictions are in place for structure repairs in STA-1E. This week, it is recommended that no Lake releases be sent to the STAs/FEBs.

## Everglades

Stage changes in the WCAs and northeastern Everglades National Park ranged from -0.08 feet to +0.07 feet. The Fish and Wildlife Commission closures within the WCAs are still in effect due to high water levels and the expectation of continued high water. The 30-day moving average salinity at the Florida Bay MFL site is 0.3 psu and the cumulative 365-day inflow from the five creeks into Florida Bay decreased to 359,633 acre-feet.

## KISSIMMEE BASIN

### Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 0.18 inches of rainfall in the past week and the Lower Basin received 0.27 inches (SFWMD Daily Rainfall Report 10/17/2016).

### Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table1.

**Table 1.** Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 10/18/2016							Sunday Departure (feet)						
Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	10/16/16	10/9/16	10/2/16	9/25/16	9/18/16	9/11/16	9/4/16
Lakes Hart and Mary Jane	S62	272	LKMJ	60.7	R	60.5	0.2	0.2	0.1	0.0	0.2	0.1	-0.1
Lakes Myrtle, Preston, and Joel	S57	145	S57	61.8	R	61.5	0.3	0.3	-0.1	0.0	0.1	0.0	-0.1
Alligator Chain	S60	0	ALLI	63.5	R	63.6	-0.1	-0.3	0.1	0.1	0.1	0.0	-0.1
Lake Gentry	S63	0	LKGT	61.3	R	61.2	0.1	-0.2	0.1	0.0	0.1	0.0	-0.1
East Lake Toho	S59	78	TOHOE	57.8	R	57.5	0.3	0.0	0.3	0.2	0.2	0.1	-0.1
Lake Toho	S61	0	TOHOW, S61	54.6	R	54.5	0.1	-0.2	0.2	0.2	0.2	0.1	0.0
Lakes Kissimmee, Cypress, and Hatchineha	S65	1131	LKISSP, KUB011, LKIS5B	52.7	R	52.0	0.7	1.0	0.6	0.6	0.9	1.4	1.2

\* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available.

\*\* Seven-day average of weighted daily means through Sunday midnight.

\*\*\* Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

### Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 12. Kissimmee River floodplain stages at selected stations are shown in Figure 13.

**Table 2.** Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 10/18/2016

Metric	Location	Sunday's 1-day average	Weekly Average**									
			10/16/16	10/9/16	10/2/16	9/25/16	9/18/16	9/11/16	9/4/16	8/28/16	8/21/16	8/14/16
Discharge (cfs)	S-65	1284	1131	1718	1968	4001	3991	3290	1080	841	624	532
Discharge (cfs)	S-65A	1564	1570	2557	2557	4966	4861	5101	2538	808	666	661
Discharge (cfs)	S-65C	2620	3124	3250	4459	5247	5054	3760	2124	928	1024	1081
Headwater stage (feet NGVD)		33.6	33.7	33.6	33.6	33.8	33.7	33.8	34.1	34.1	34.0	34.1
Discharge (cfs)	S-65D****	3375	3859	4185	5532	6302	5224	3971	2172	1181	1140	1142
Discharge (cfs)	S-65E	2888	3553	3841	4960	5802	5246	4077	2900	910	1061	1137
DO concentration (mg/L)***	Phase I river channel	4.05	3.38	2.83	1.78	1.55	1.20	1.35	3.88	4.75	4.04	4.09
Mean depth (feet)*	Phase I floodplain	1.05	1.26	1.55	2.11	2.49	2.28	1.71	0.65	0.28	0.37	0.41

\* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

\*\* Seven-day average of weighted daily means through Sunday midnight.

\*\*\* DO is the average for PC62 and PC33 starting June 2. PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

\*\*\*\* S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2.

DATA ARE PROVISIONAL.

## Water Management Recommendations

### Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
10/17/2016	Temporarily reduce discharge at S65A to 700 cfs following the discharge rampdown schedule in Figure 8a.	To facilitate MacArthur Ditch backfilling over the next 2-3 weeks.	Implemented	KB Operations
10/10/2016	No new recommendations.			
10/3/2016	No new recommendations.			
9/27/2016	<ul style="list-style-type: none"> <li>Begin reducing discharge when Ops and management feel the time is right (could be now)</li> <li>Use the discharge table below to ramp down to 1400 cfs; however, if stage should stop declining or start to rise during the rampdown, hold the current discharge unless stage begins to decline again</li> <li>If KCH stage reaches ~50.5 ft, hold ~1400 cfs while KCH stage is at or above ~50.5 ft, then: <ul style="list-style-type: none"> <li>If KCH stage declines below ~50.5 ft, continue reducing discharge, potentially to minimum discharge. However, if stage stops declining or starts to rise during the rampdown, hold or increase current discharge until stage begins to decline again or until it rises to ~50.5 ft</li> <li>If KCH stage rises or stays above ~50.5 ft, hold ~1400 cfs unless stage approaches ~0.25 ft below the regulation line. If stage continues to rise into this buffer zone, use the discharge table to ramp up in anticipation of flood control releases</li> </ul> </li> </ul>	To the extent possible, avoid repeated wet/dry cycles in the Kissimmee River floodplain and extend the period of continuous floodplain inundation without decreasing lake stage too much. The recommendation is similar to the discharge plan used last wet season that balanced the river, the KCOL, and downstream waterbodies.	TBD	KB Operations
9/20/2016	No new recommendations.			
9/13/2016	No new recommendations.			
9/6/2016	No new recommendations.			
8/30/2016	Use figure 8a as possible for discharge rampup/rampdown at S65/S65A.			
8/23/2016	No new recommendations.			
8/16/2016	No new recommendations.			
8/9/2016	No new recommendations.			
8/2/2016	No new recommendations.			
7/26/2016	No new recommendations.			
7/19/2016	No new recommendations.			
7/12/2016	No new recommendations.			
6/30/2016	Ramp down S65/S65A discharge by 150 cfs per day to 650 cfs and hold at 650 cfs until lake stage rises to Zone A of the schedule. When stage enters Zone A, ramp up S65 discharge to 1,400 cfs as stage rises from 0.0 to 0.6 feet above the regulation line unless there is a large rainfall event. This ramp up schedule will be reevaluated when the regulation schedule reaches 52.0 feet NGVD.	The ramp down in S65/S65A discharge is intended to lessen the impact of Lake Okeechobee releases on naturally occurring algal blooms. Holding discharge at 650 cfs reflects consideration for the Snail Kites nesting in the Kissimmee River floodplain.	Implemented	SFWMD Operations Control
6/28/2016	No new recommendations.			
6/21/2016	No new recommendations.			
6/14/2016	No new recommendations.			
6/7/2016	No new recommendations.			
5/31/2016	No new recommendations.			
5/24/2016	No new recommendations.			
5/17/2016	No new recommendations.			
5/10/2016	No new recommendations.			
5/3/2016	No new recommendations.			
4/26/2016	No new recommendations.			
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			

## KCOL Hydrographs (through Sunday midnight)

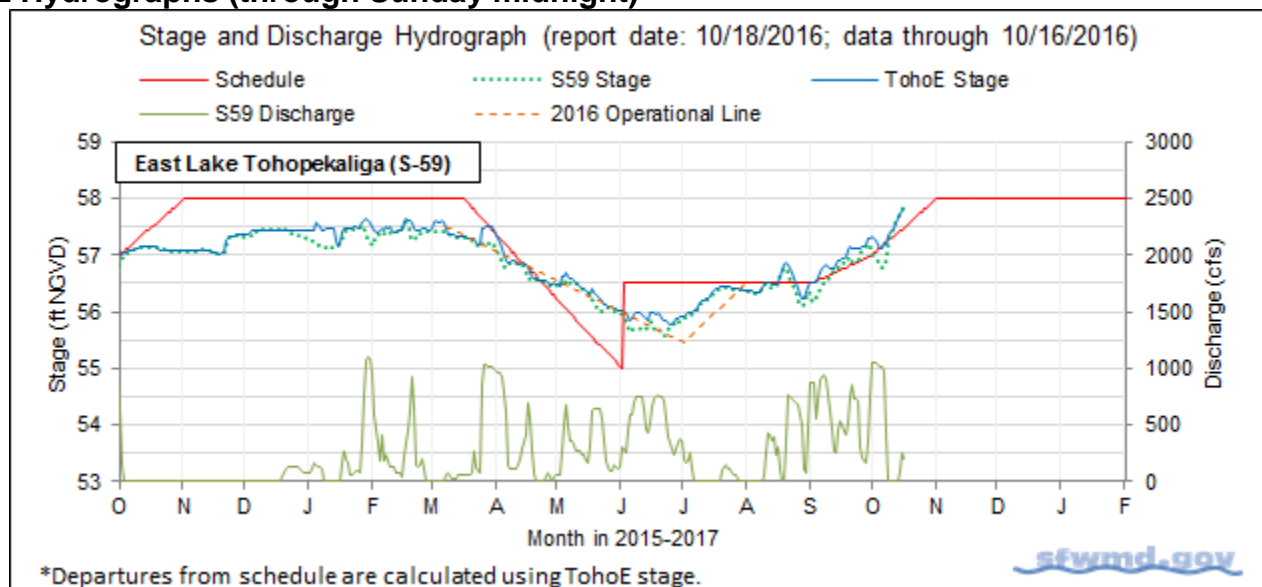


Figure 1.

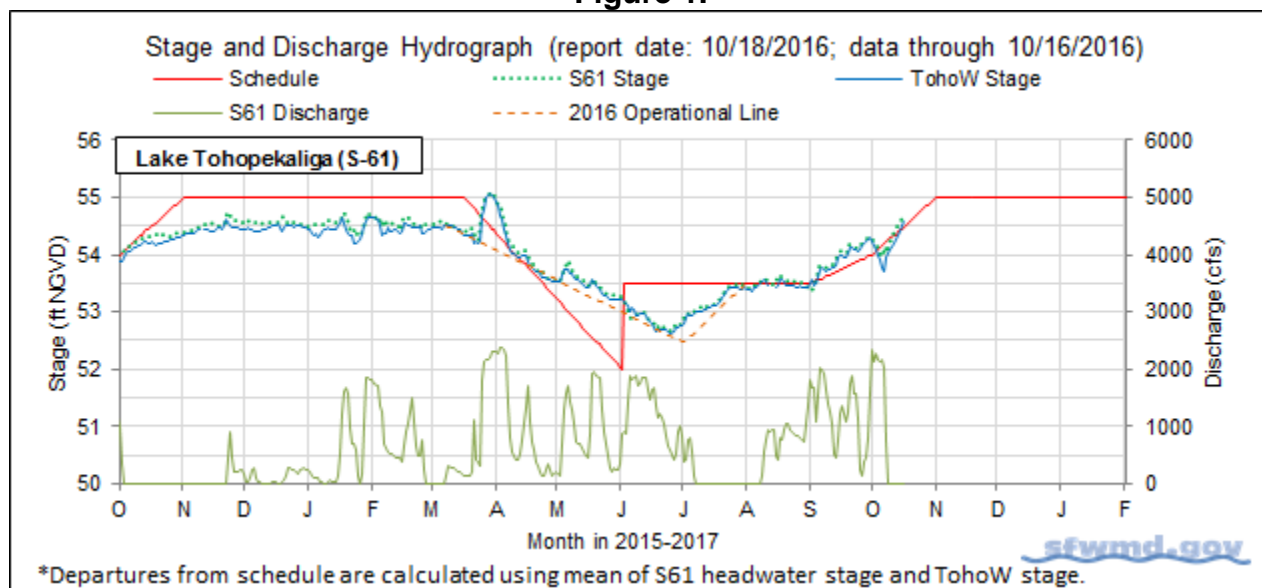


Figure 2.

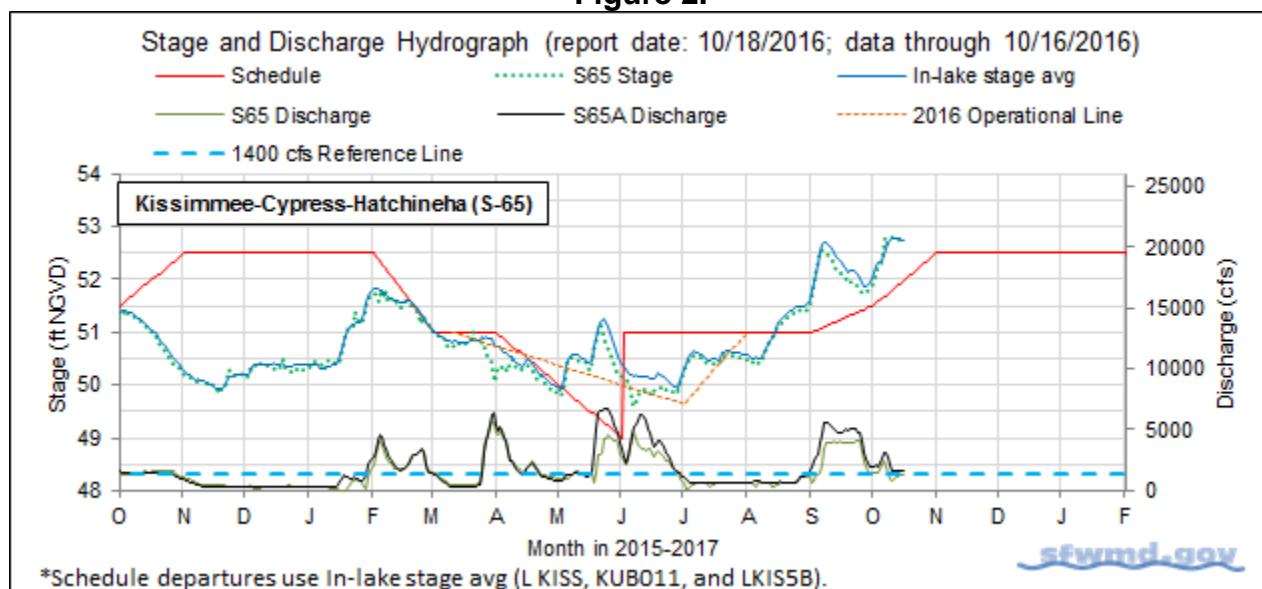


Figure 3.

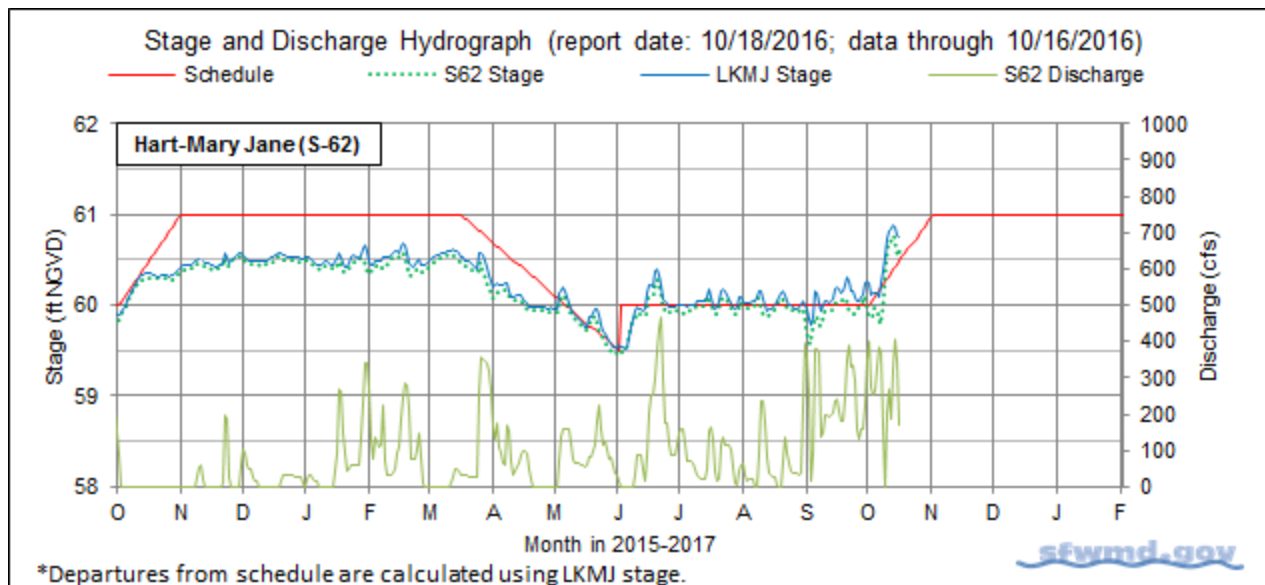


Figure 4.

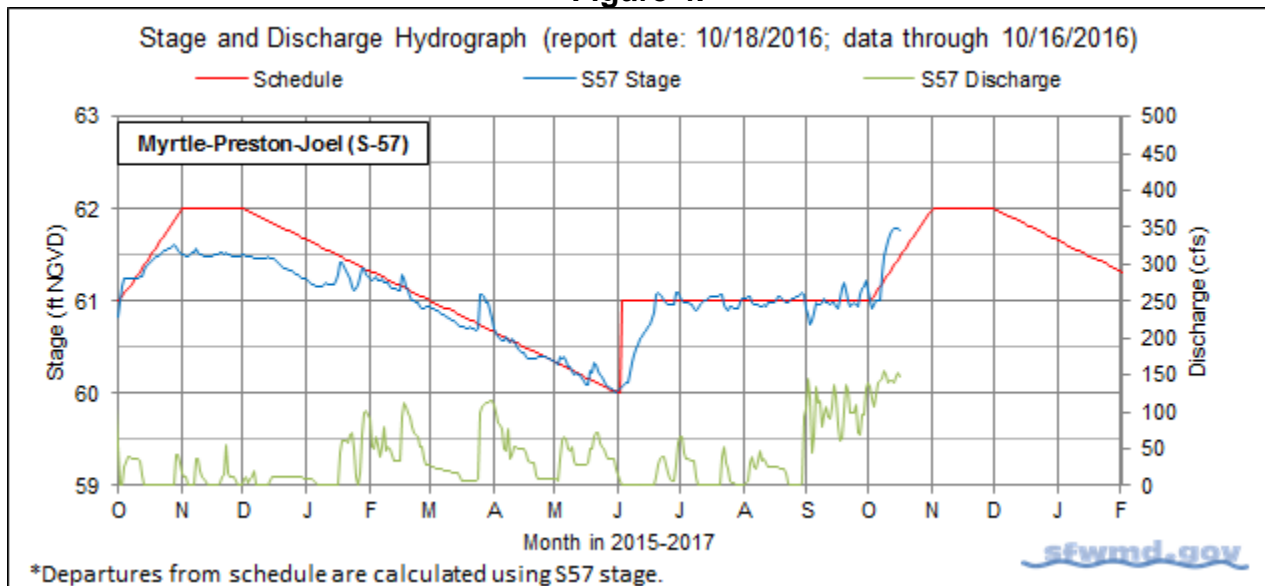


Figure 5.

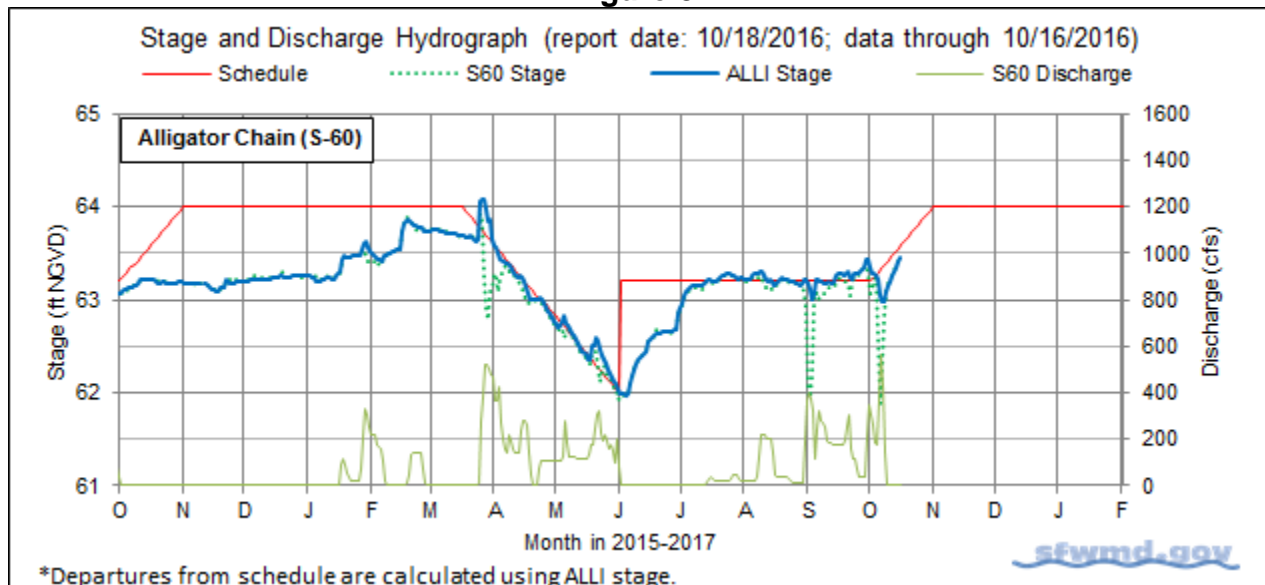


Figure 6.

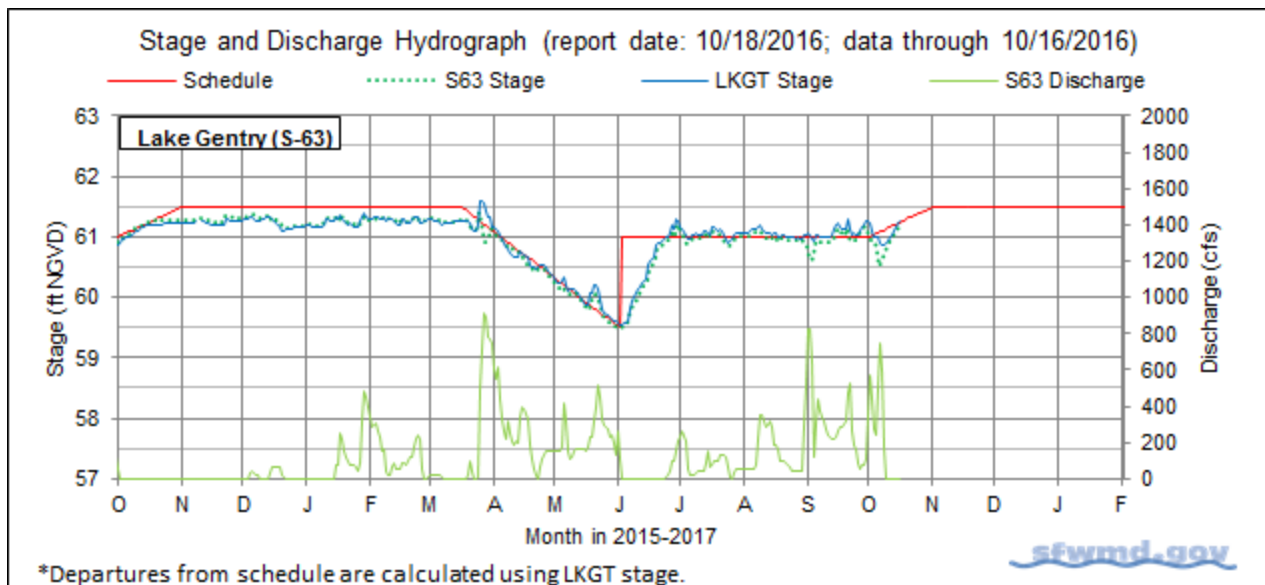
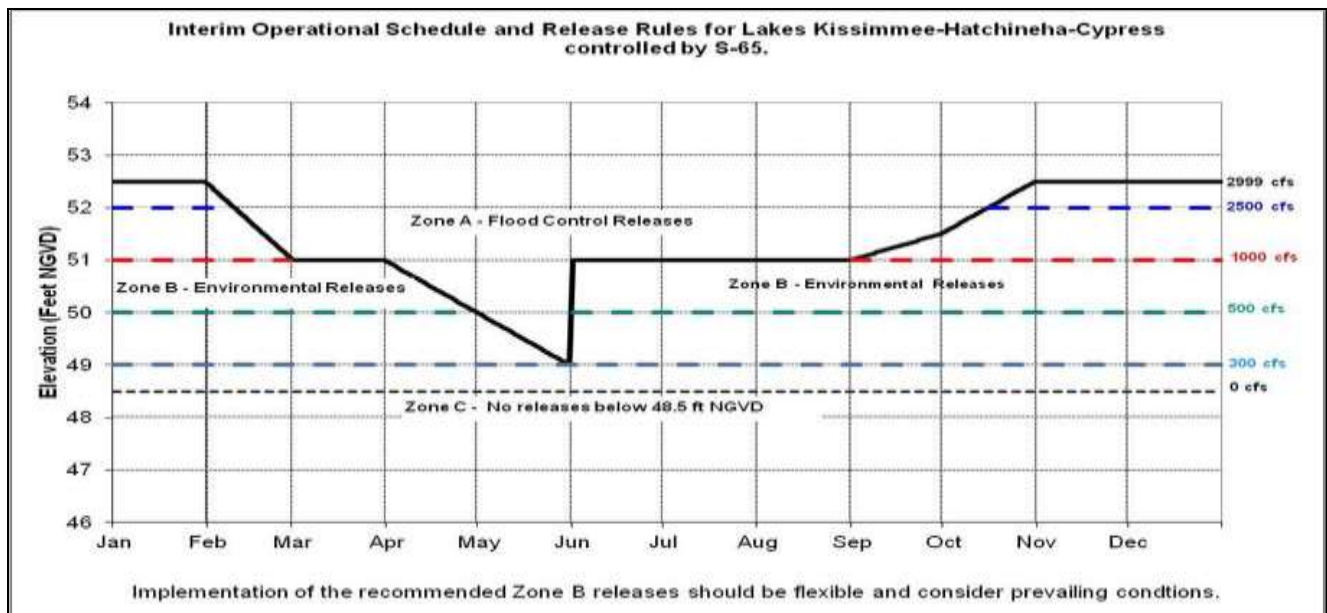


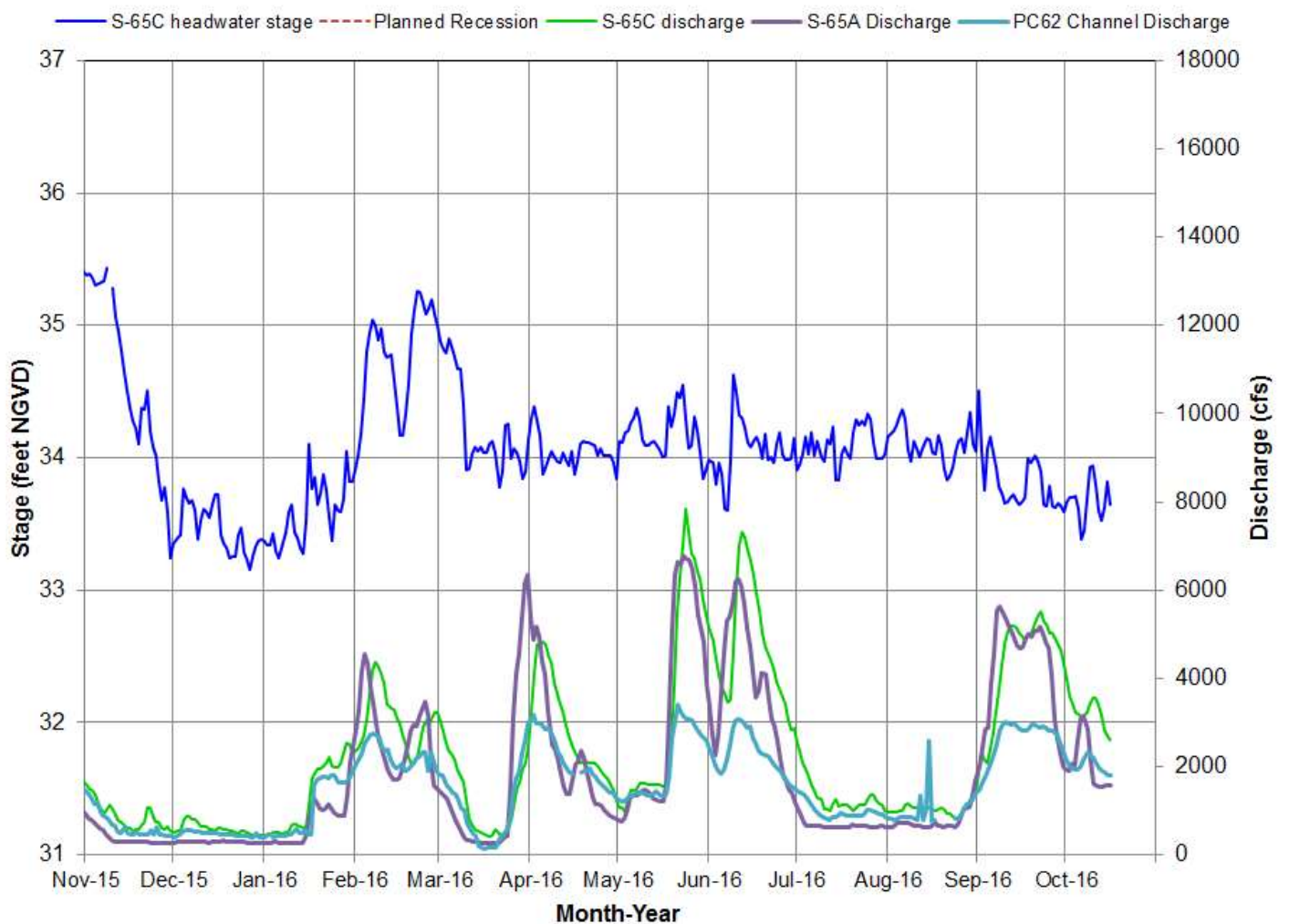
Figure 7.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT	
Limits on Rate of Discharge Change at S65/S65A During Wet Season 2016	
Discharge Rate of Change Limits for S65/S65A (revised 10/18/16).	
Q (cfs)	Maximum rate of increase or decrease (cfs/day)
650-1700	150
1700-3000	300
>3000	1000

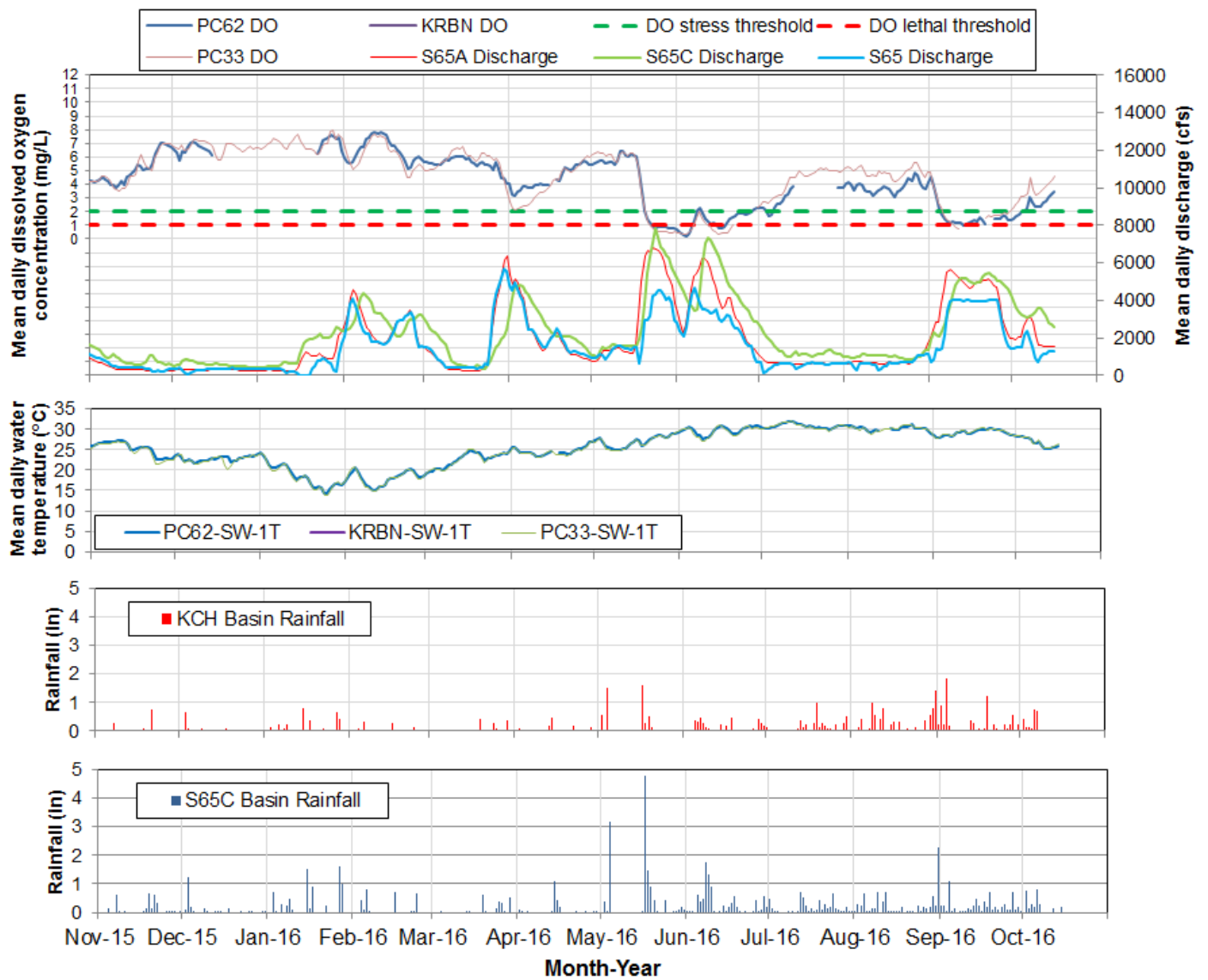
Figure 8a. Limits on rate of discharge change at S65/S65A for the 2016 Wet Season.



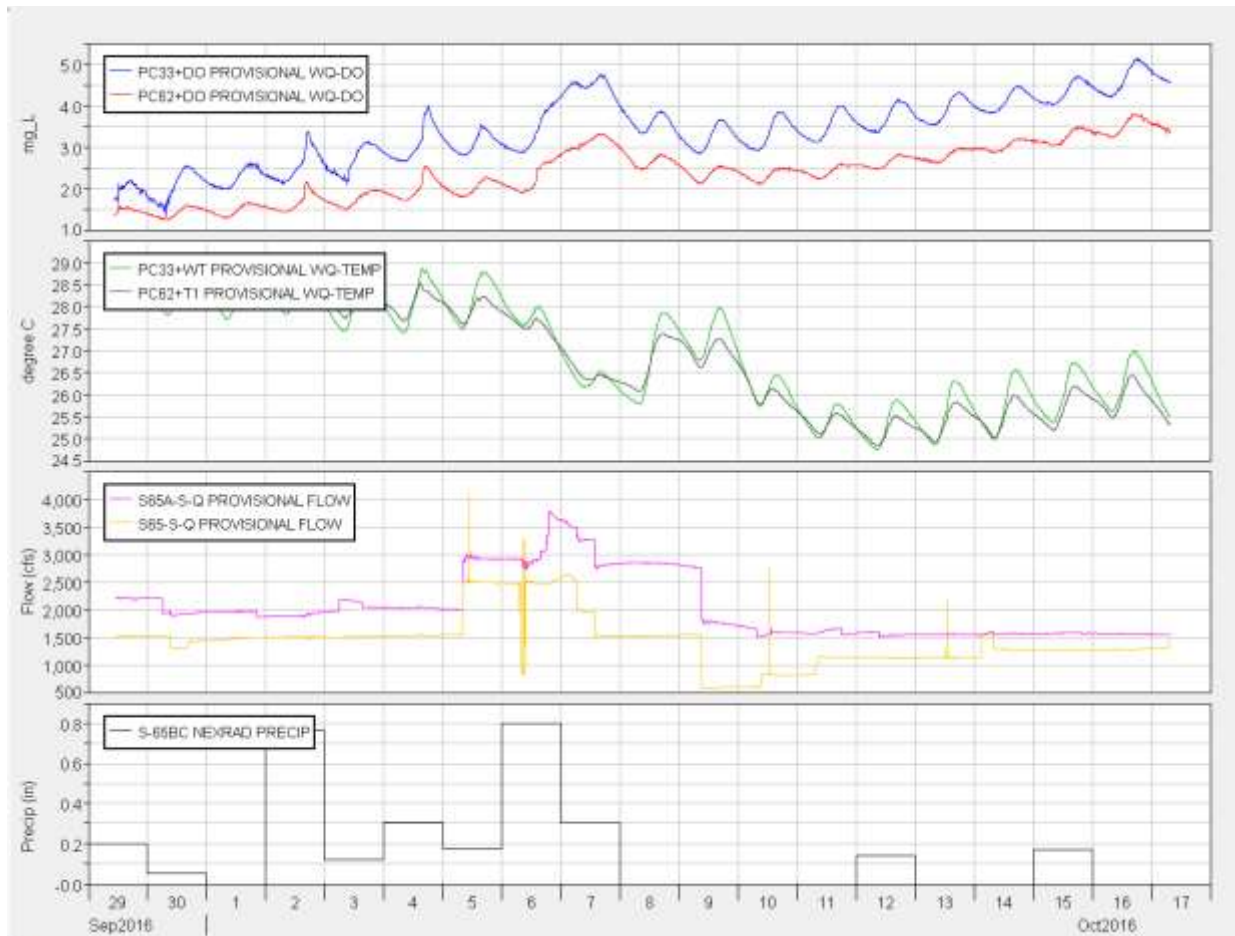
**Figure 8b.** Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.



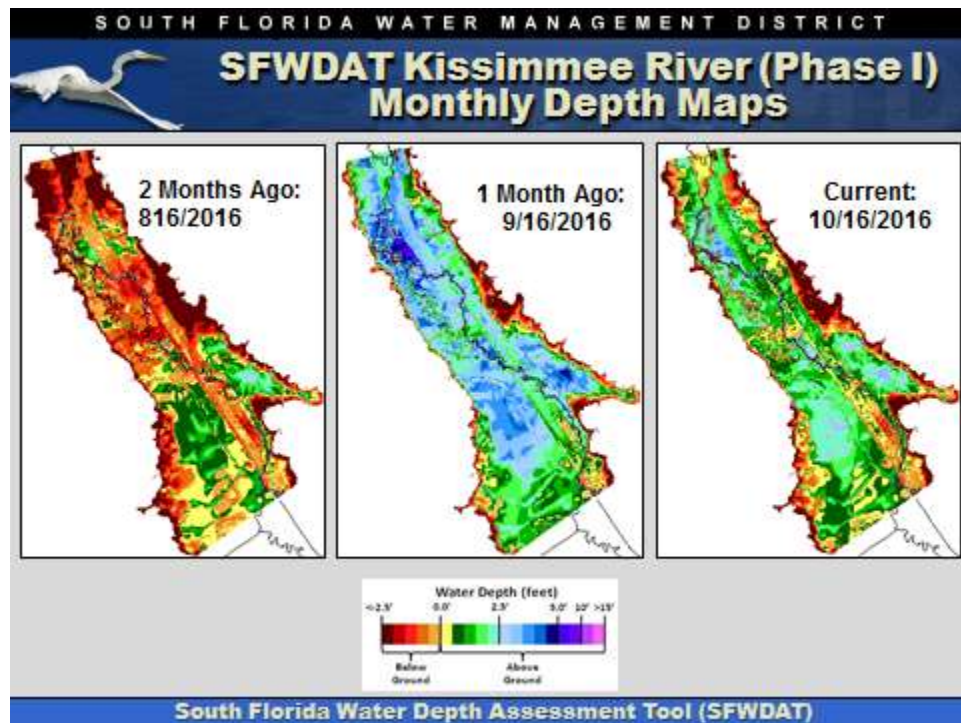
**Figure 9.** S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.



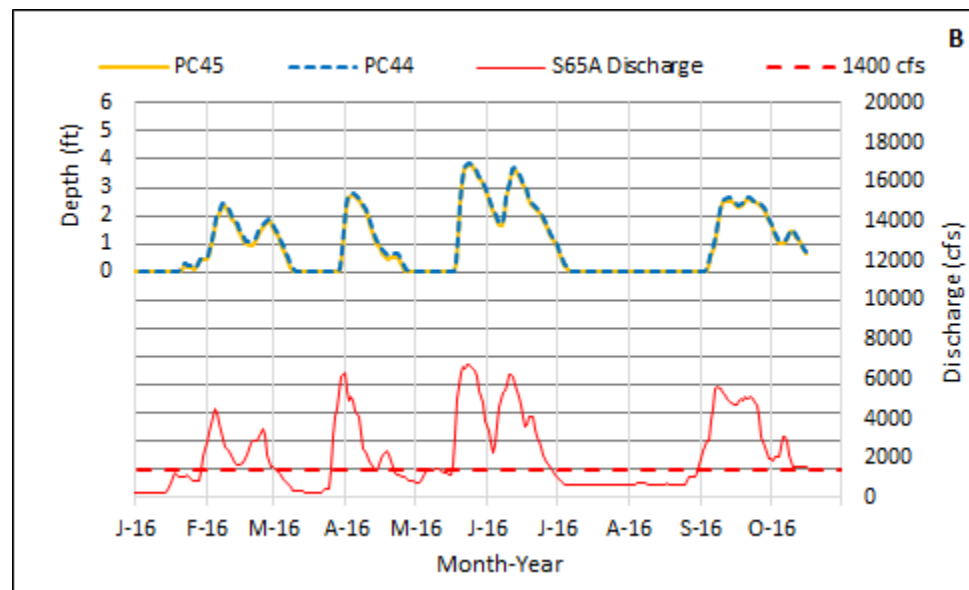
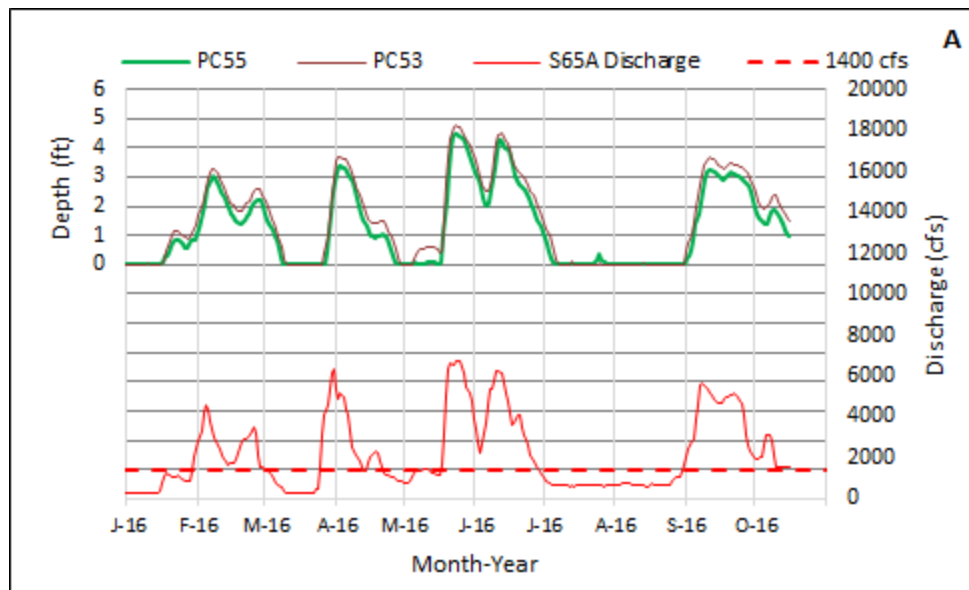
**Figure 10.** Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.



**Figure 11.** Phase I river channel dissolved oxygen and water temperature (measured at 15 minute intervals) and Pool BC daily rainfall.

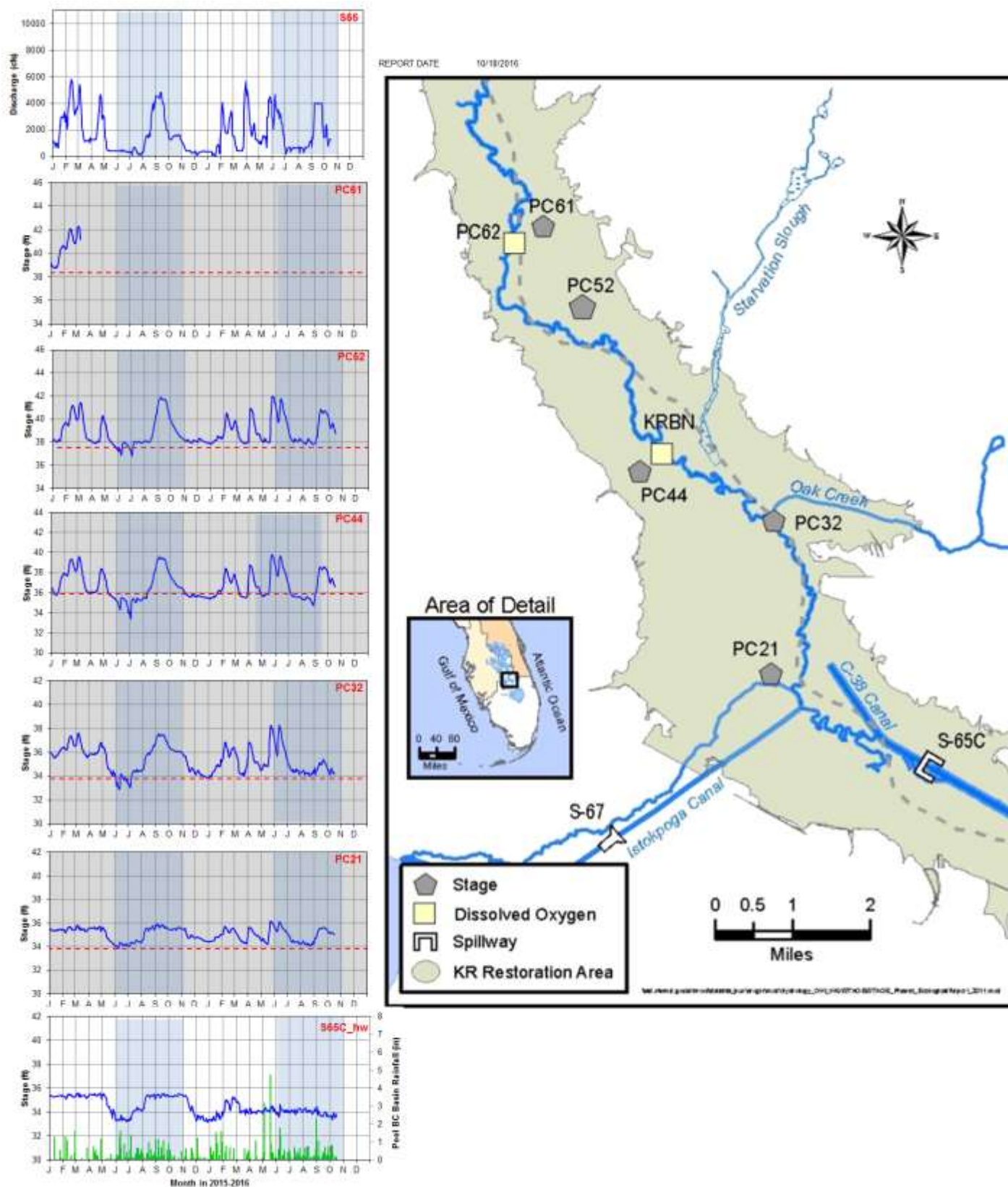


**Figure 12.** Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.



**Insert.** Water depth at selected northern Kissimmee River floodplain sites on (A) the PC5's transect and (B) the PC4's transect, with S65A discharge.

## Kissimmee River Hydrographs



**Figure 13.** Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

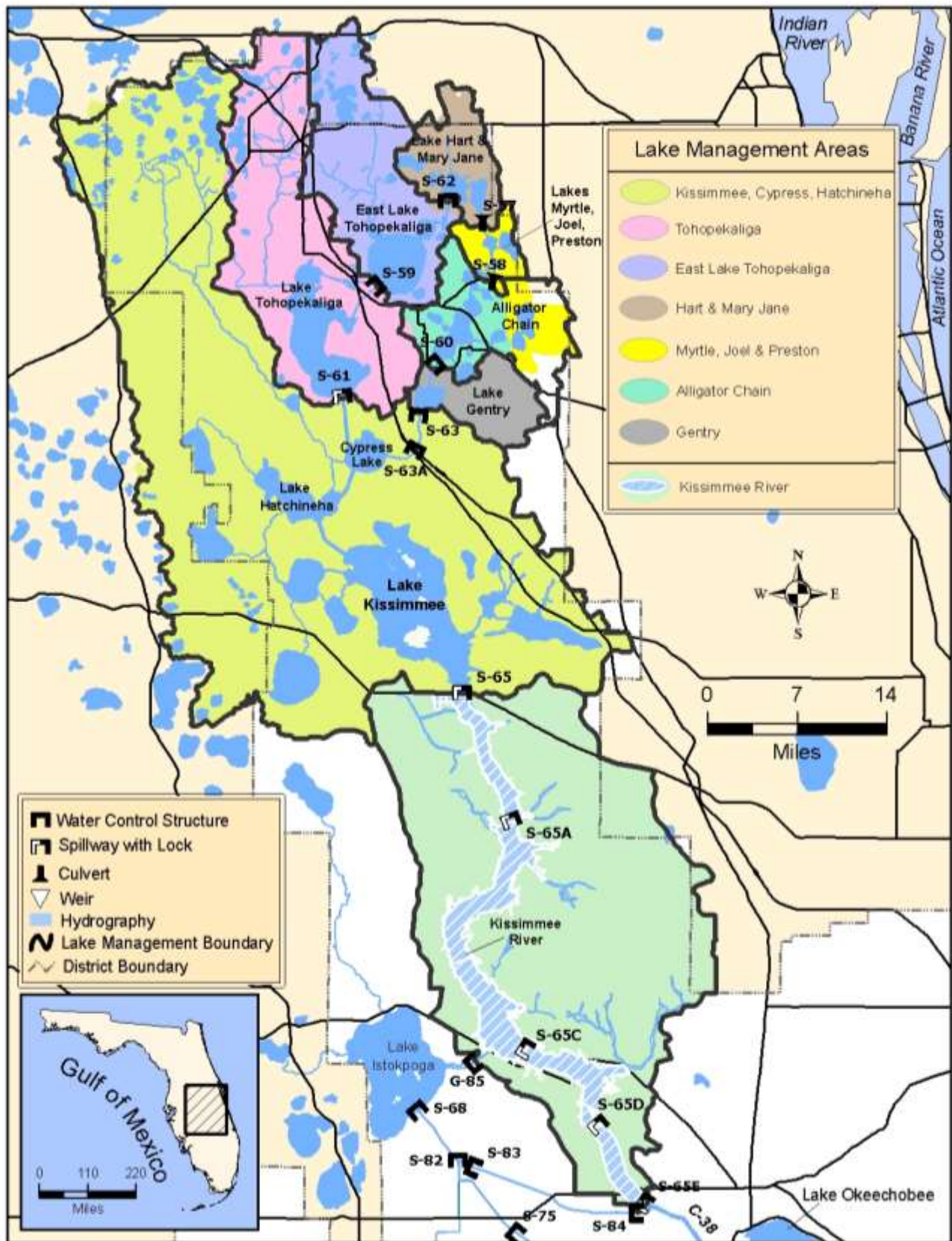


Figure 14. The Kissimmee Basin

## **LAKE OKEECHOBEE**

According to the USACE web site, Lake Okeechobee stage is at 15.90 feet NGVD for the period ending at midnight on October 17, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage decreased by 0.11 feet over the past week but is still 0.48 feet higher than it was a month ago and 1.13 feet higher than it was a year ago (Figure 1). The Lake is currently in the Low sub-band (Figure 2). According to RAINДАР, 0.12 inches of rain fell directly over the Lake during the past seven days. Similar or slightly greater amounts fell in most of the surrounding watershed.

Based on USACE reported values, current Lake inflow is approximately 3,792 cfs as detailed below.

<b>Structure</b>	<b>Flow cfs</b>
S65E	2424
S154	125
S84 & 84X	22
S71	73
S72	38
C5 (Nicodemus slough dispersed storage)	-124
S191	142
S133 PUMPS	165
S127 PUMPS	129
S129 PUMPS	76
S131 PUMPS	0
S135 PUMPS	212
Fisheating Creek	511
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 6,739 cfs with 5,548 cfs exiting at S77, and 1124 cfs exiting at S308 and 67 cfs exiting the L8 canal through Culvert 10A. No water exited through S351, S352 or S354. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 1,380 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

No new MODIS imagery is available due to cloud cover.

Lake stage decreased over the past week. However, levels remain above the top of the preferred stage envelope (15.5 feet NGVD). Future short-term recommendations are to lower Lake levels. From an ecological perspective, the Lake is too high for this time of year and levels have been too high since the February rain event resulting in a loss of submerged aquatic vegetation (SAV) and increased cyanobacterial blooms and associated toxins. If elevated Lake levels persist into the next growing season we expect additional damage to SAV and a resurgence of the bloom conditions that characterized this past wet season. The goal should be to continue the downward trend in Lake stage as levels have moved past the top of the preferred stage envelope. Further increases in stage will result in additional ecological damage. Near optimal Lake stages will be necessary this coming spring

and summer to provide conditions conducive to the reestablishment of the SAV acreage lost this year due to high Lake stages.

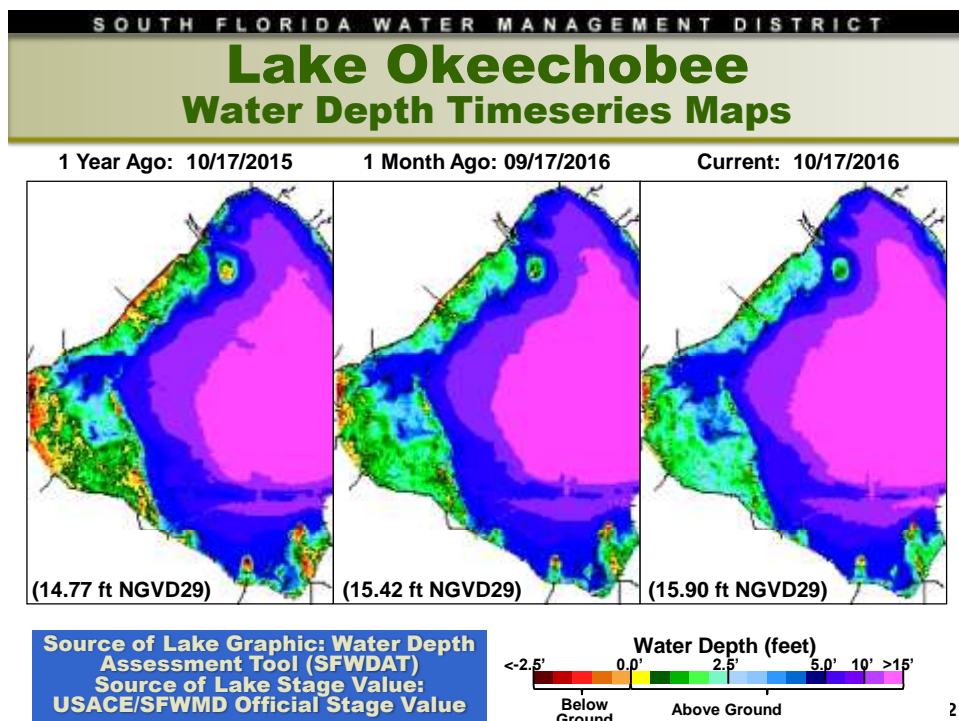


Figure 1

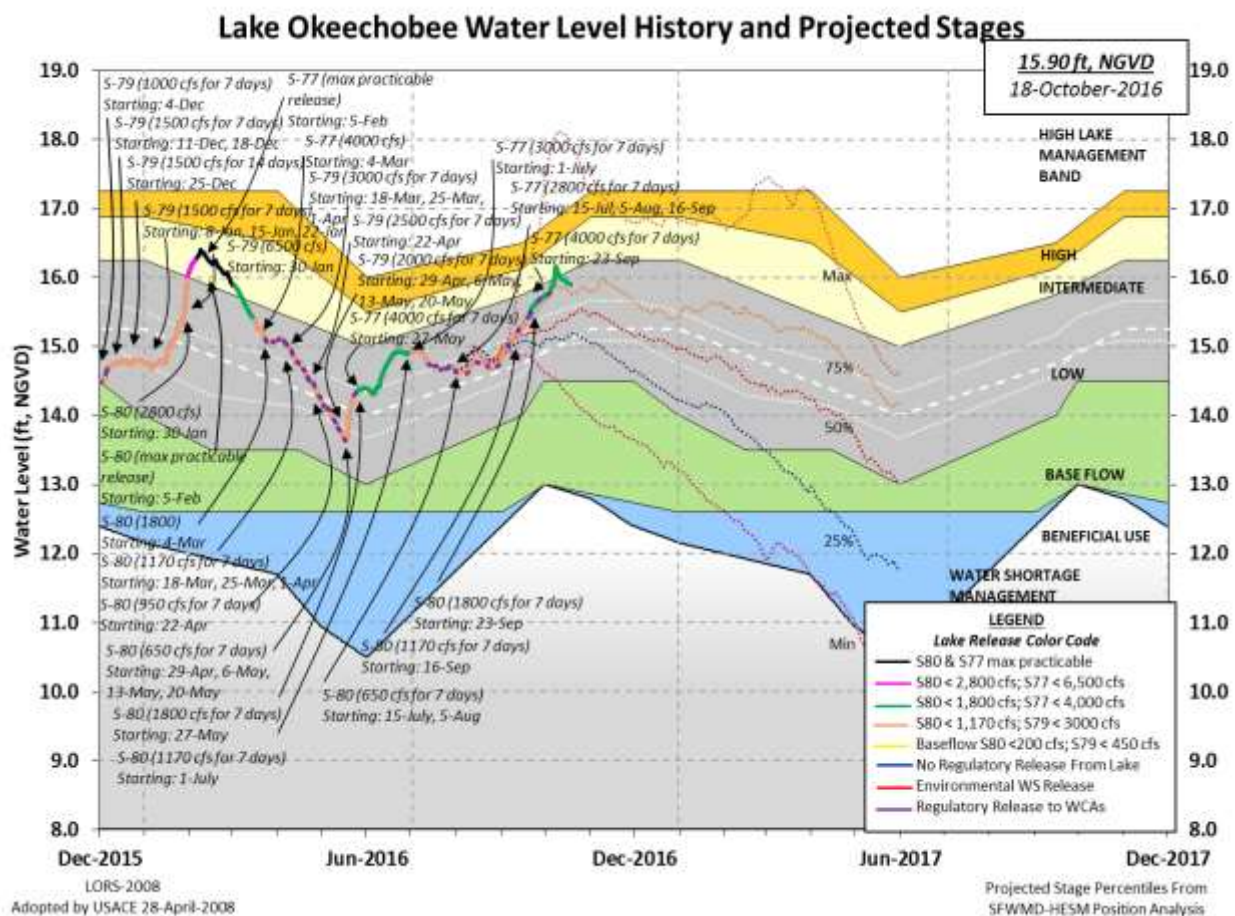


Figure 2

# SFWMD PROVISIONAL RAINDAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0215 EST, 10/11/2016

THROUGH: 0215 EST, 10/18/2016

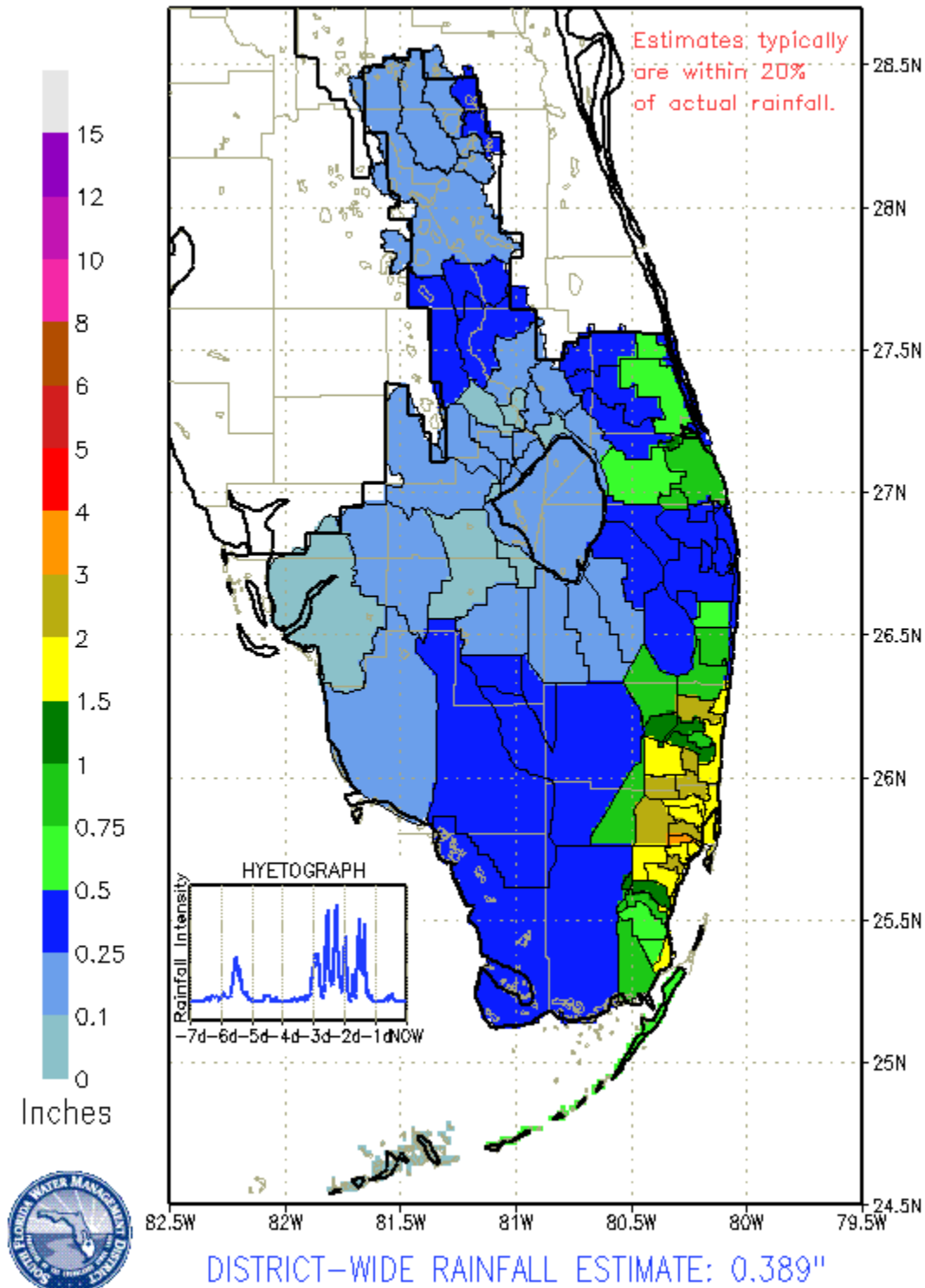


Figure 3

<b>INFLOWS</b>	<b>Average Daily Flow Past Week cfs</b>	<b>Feet of Change Past Week</b>
<b>S65E</b>	<b>3325</b>	<b>0.106</b>
<b>S71 &amp; 72</b>	<b>253</b>	<b>0.008</b>
<b>S84 &amp; 84X</b>	<b>207</b>	<b>0.007</b>
<b>Fisheating Creek</b>	<b>825</b>	<b>0.026</b>
Rainfall	N.A.	<b>0.057</b>
<b>OUTFLOWS</b>	<b>Average Daily Flow Past Week cfs</b>	<b>Feet of Change Past Week</b>
<b>S77</b>	<b>5939</b>	<b>0.189</b>
<b>S308</b>	<b>733</b>	<b>0.023</b>
<b>S351</b>	<b>0</b>	<b>0.000</b>
<b>S352</b>	<b>0</b>	<b>0.000</b>
<b>S354</b>	<b>0</b>	<b>0.000</b>
<b>L8</b>	<b>47</b>	<b>0.001</b>
<b>ET</b>	<b>1380</b>	<b>0.044</b>

Figure 4

### Lake Istokpoga

The Lake Istokpoga regulation schedule has reached winter pool stage of 39.50 feet NGVD. Lake stage is 39.42 feet NGVD and is currently 0.08 feet below regulation stage (Figure 5). Average flows into the Lake from Arbuckle and Josephine creeks were 737 cfs and 126 cfs respectively, a decrease in total flow from the previous week. There was no discharge from S68 and S68X this past week. According to RAINДАР, 0.26 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

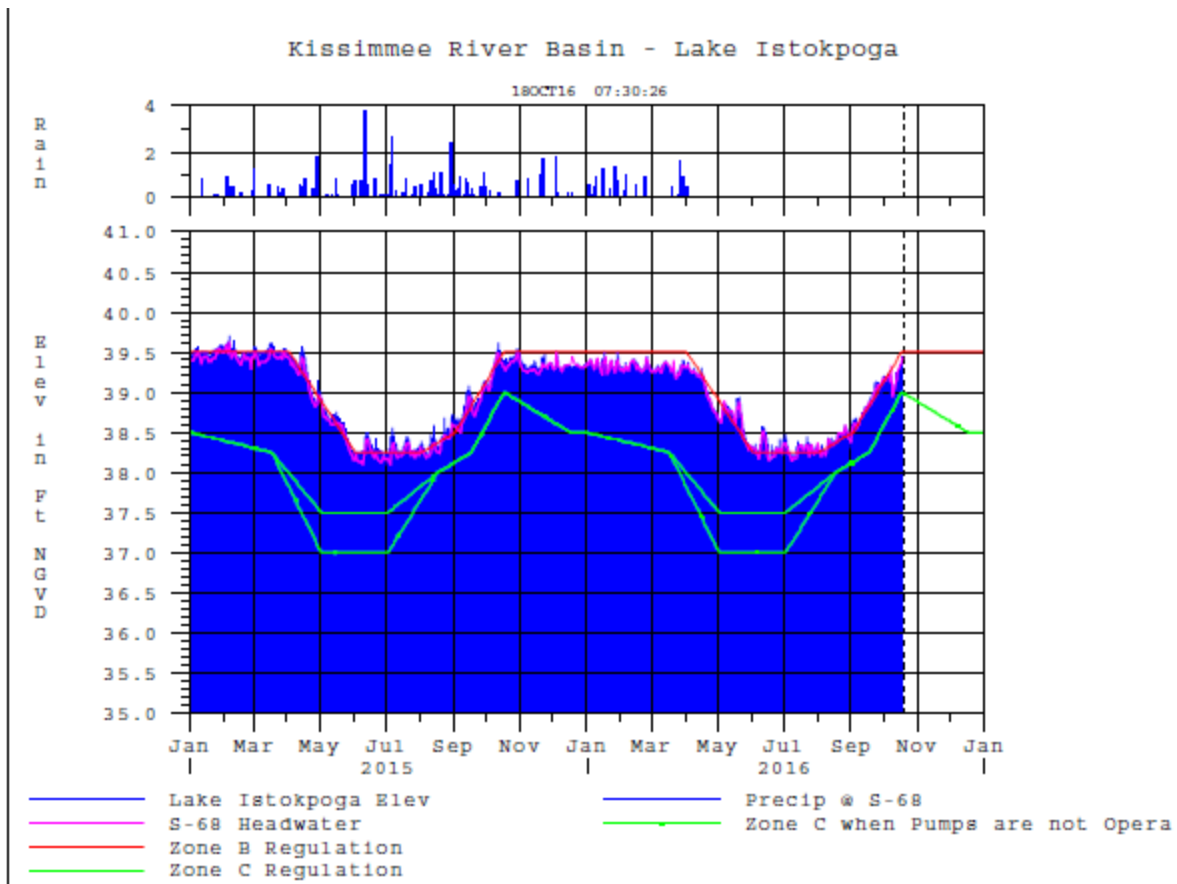


Figure 5

## ESTUARIES

### St. Lucie Estuary

Over the past week, provisional flows averaged about 1,028 cfs at S-80, 752 cfs downstream of S-308, 183 cfs at S-49 on C-24, 233 cfs at S-97 on C-23, and 789 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 444 cfs (Figures 1 and 2). Total inflow averaged about 2,677 cfs last week and 3,802 cfs over last month.

Over the past week in the estuary, salinity remained about the same at HR1 and increased at the other two sites (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 2.9. Salinity conditions in the middle estuary are in the poor range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	<b>0.3</b> (0.5)	<b>0.6</b> (0.6)	NA <sup>1</sup>
US1 Bridge	<b>2.0</b> (1.0)	<b>3.8</b> (1.2)	10.0-26.0
A1A Bridge	<b>13.3</b> (6.9)	<b>22.6</b> (15.2)	NA

<sup>1</sup>Envelope not applicable

### Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 5,939 cfs downstream of S-77, 5,179 cfs at S-78, and 5,795 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 731 cfs (Figures 5 and 6). Total inflow averaged 6,526 cfs last week and 7,504 cfs over last month.

Over the past week in the estuary, salinity remained about fresh to Cape Coral and increased downstream (Table 2, Figures 7 and 8). The seven-day average salinity values are within the good range for adult oysters at Shell Point and at Sanibel and in the poor range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.2 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass.

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA <sup>1</sup>
*Val I75	<b>0.2</b> *(0.2*)	<b>0.2</b> *(0.2*)	0.0-5.0 <sup>2</sup>
Ft. Myers Yacht Basin	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	NA
Cape Coral	<b>1.5</b> (0.2)	<b>2.5</b> (0.2)	10.0-30.0
Shell Point	<b>12.0</b> (5.1)	<b>16.4</b> (11.9)	10.0-30.0
Sanibel	<b>25.2</b> (22.3)	<b>27.2</b> (25.9)	10.0-30.0

<sup>1</sup>Envelope not applicable and <sup>2</sup>Envelope is based on a 30-day average.

\*Val I75 is temporarily offline due to site construction,  
Salinity values are estimated using models developed for this site.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	4.6 – 6.0	5.0 – 6.2	2.0 – 5.3
Dissolved Oxygen (mg/l)	4.3 – 5.6	6.6 – 7.5	4.4 – 7.1

The Florida Fish and Wildlife Research Institute reported on October 14, 2016, that *Karenia brevis*, the Florida red tide organism, was observed in background to low concentrations in seven samples and medium concentration in one sample (Boca Grande Pass) collected from Lee County. Concentrations in the Caloosahatchee area were not present or were very low.

### **Water Management Recommendations**

Given the current estuarine conditions, there are no ecological benefits associated with additional releases from Lake Okeechobee.

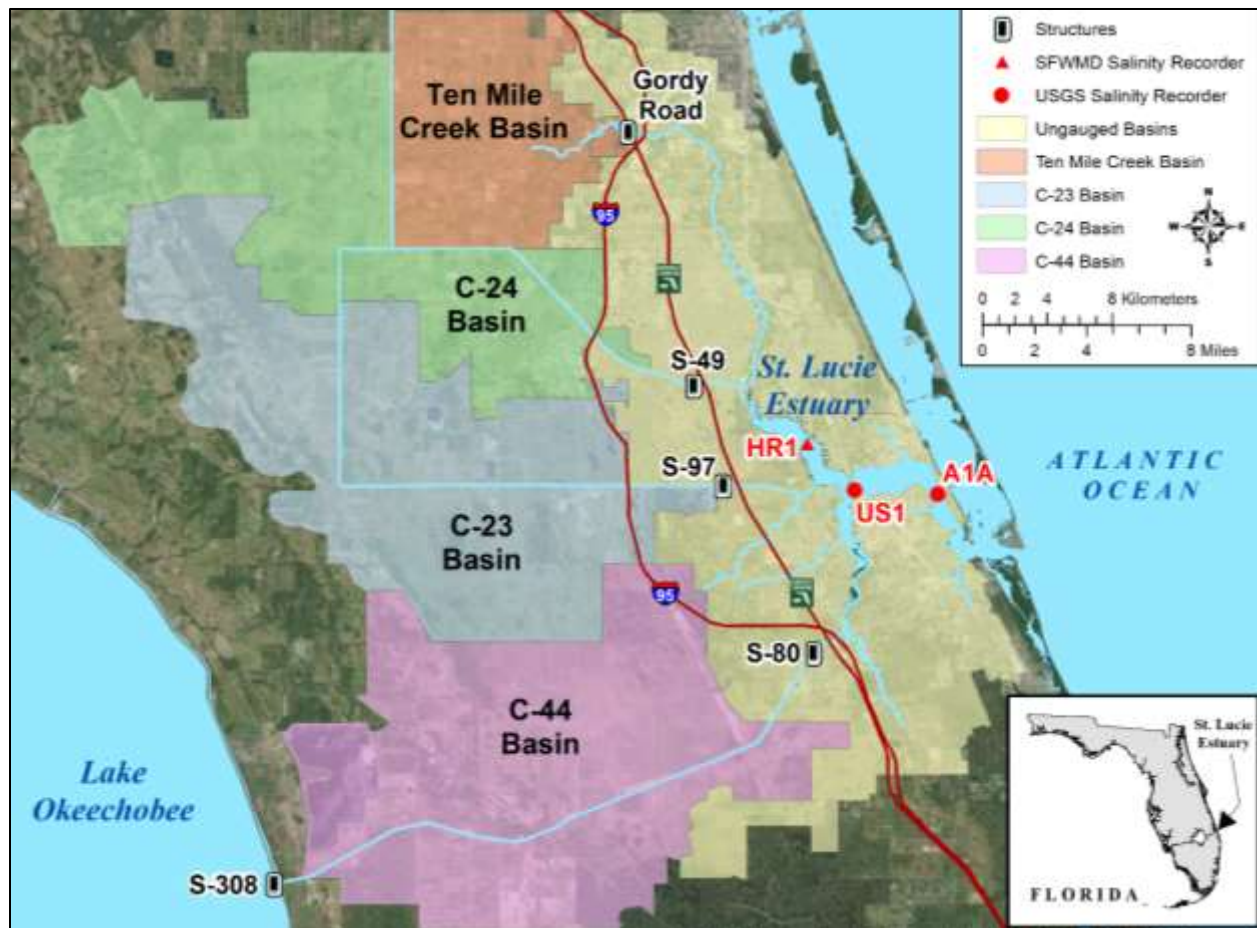


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

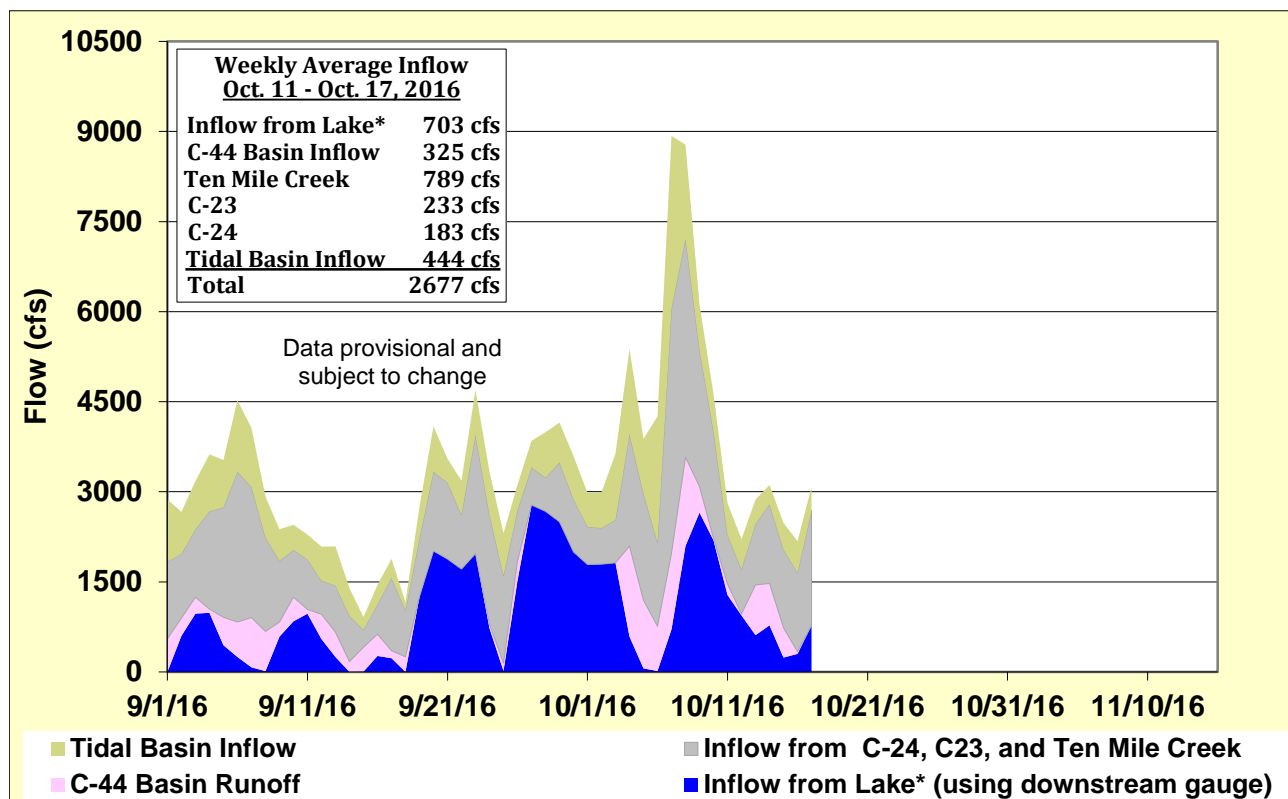


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

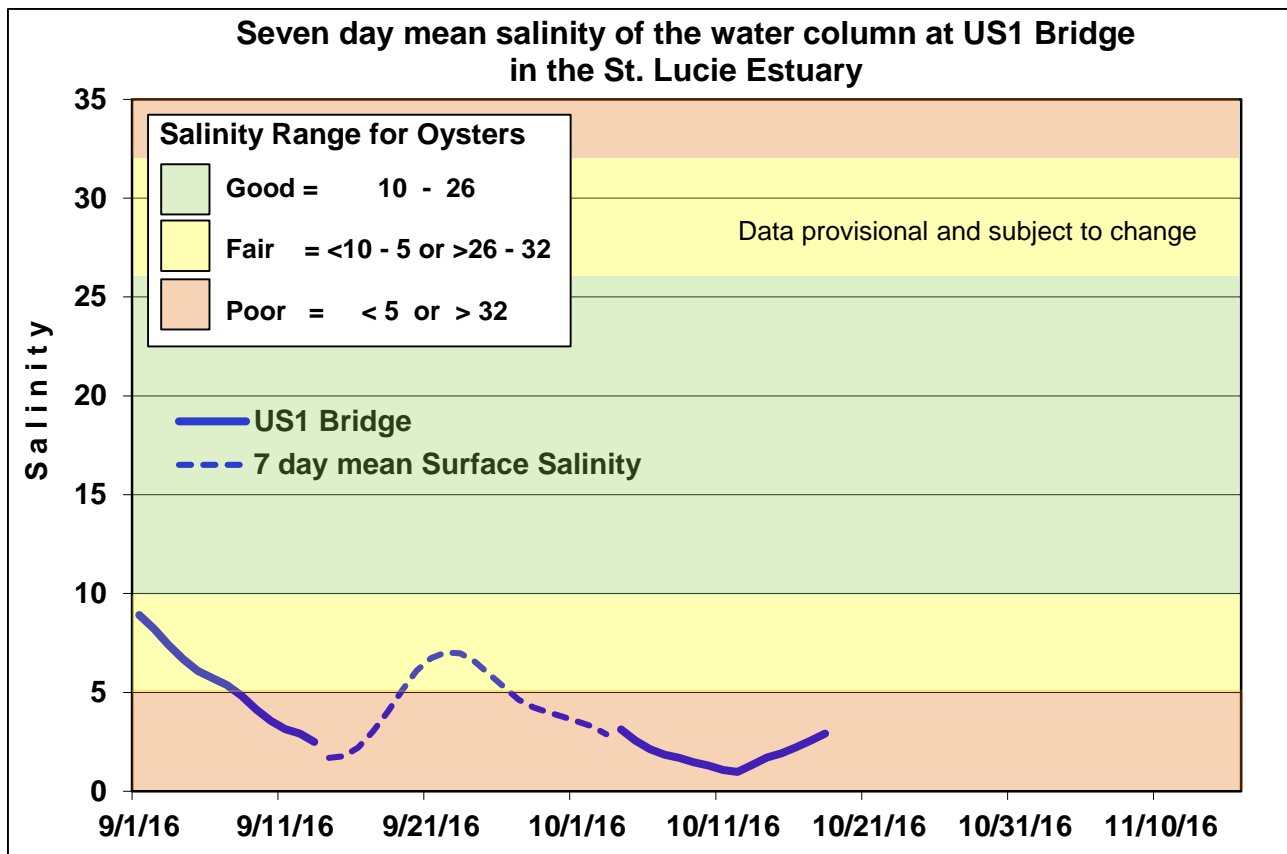


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

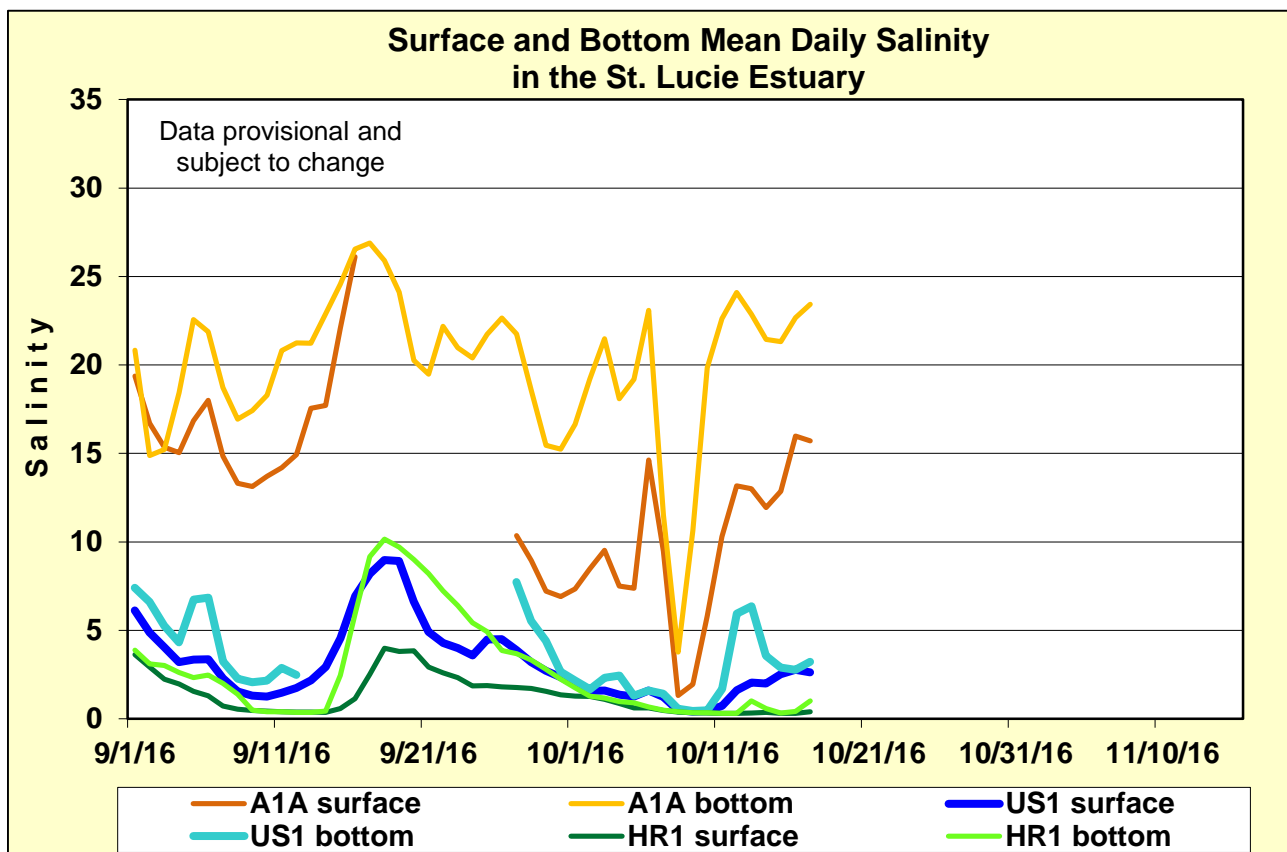


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

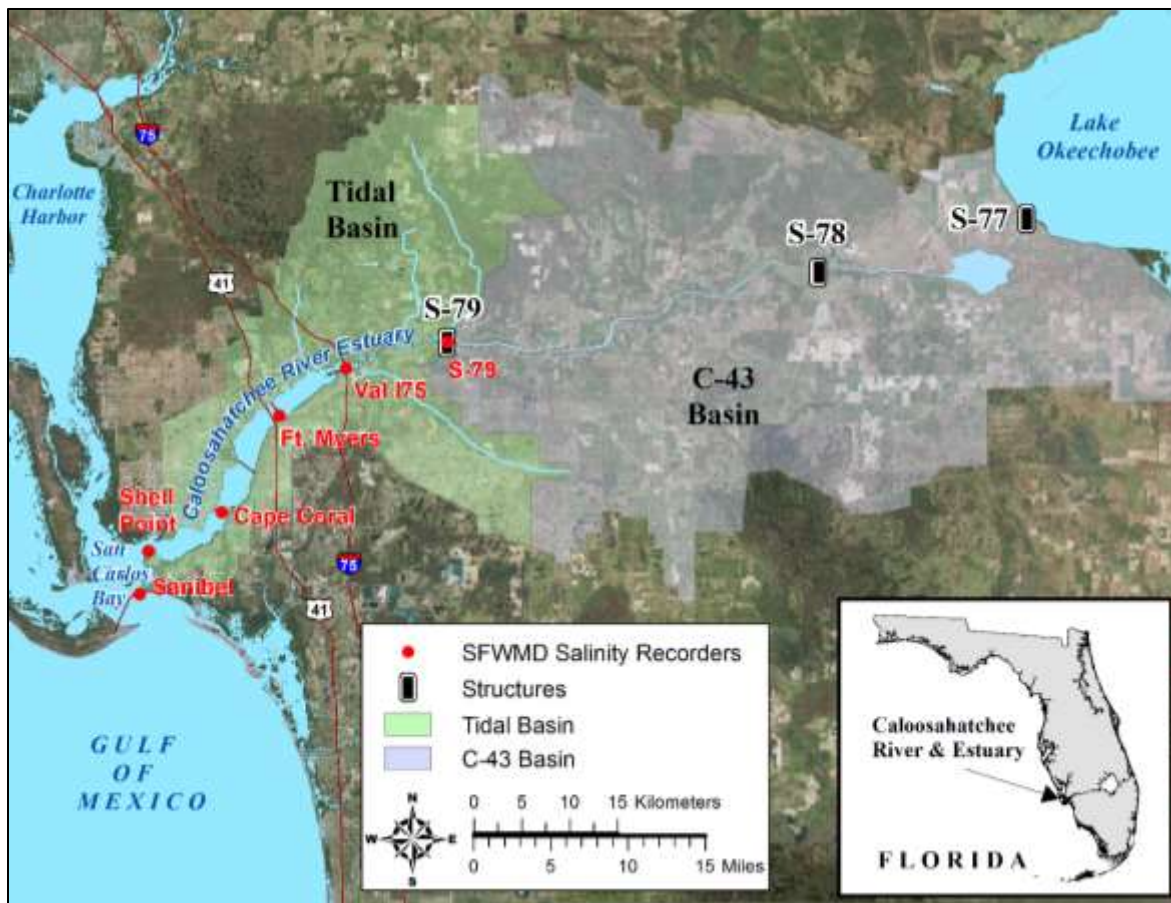


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

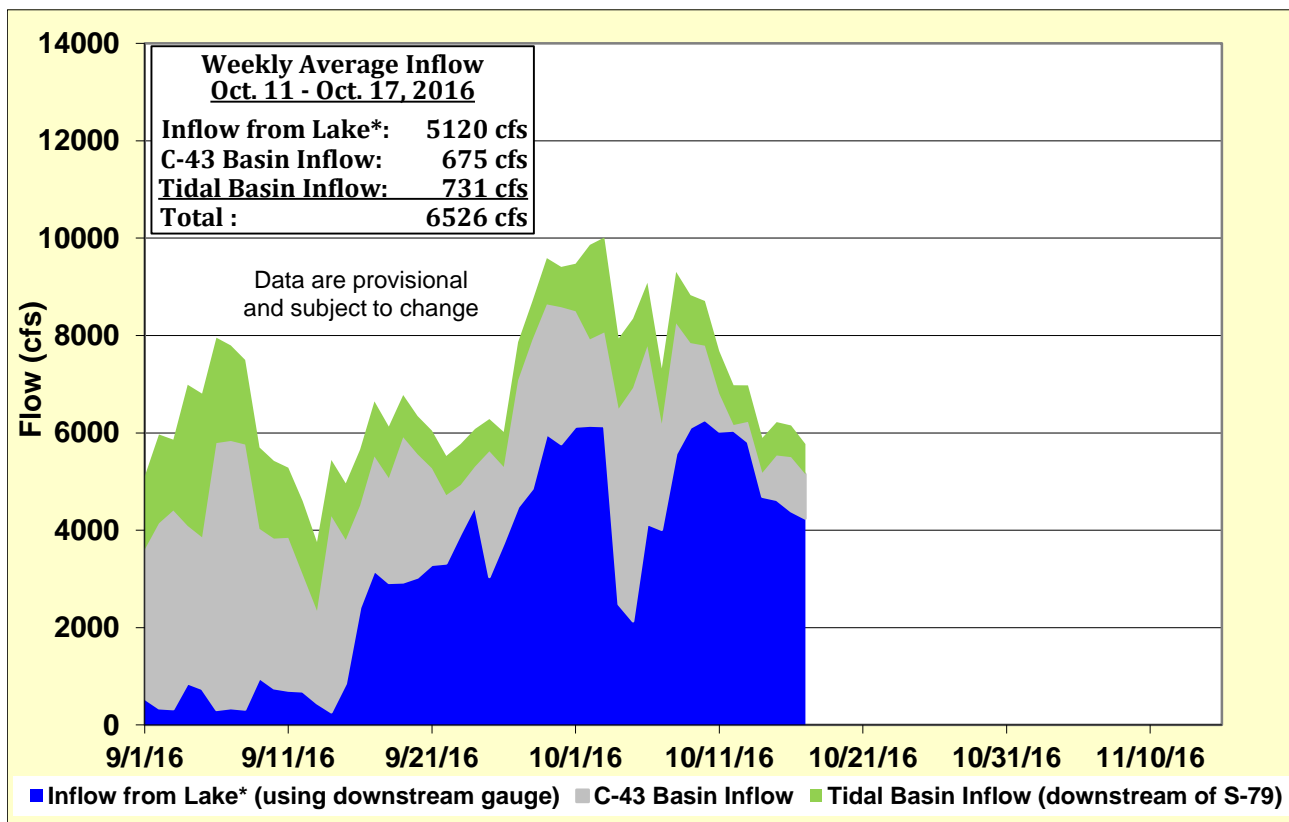


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.

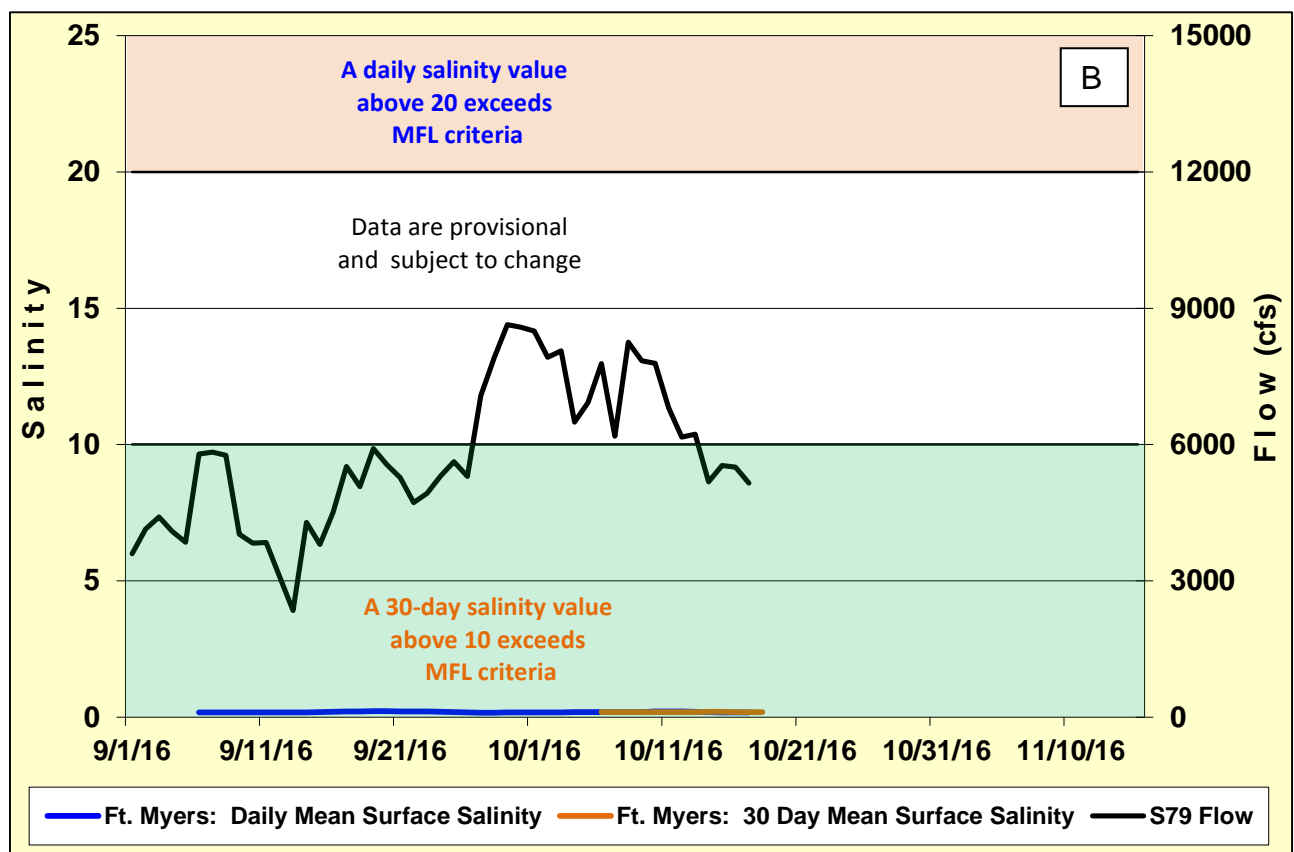
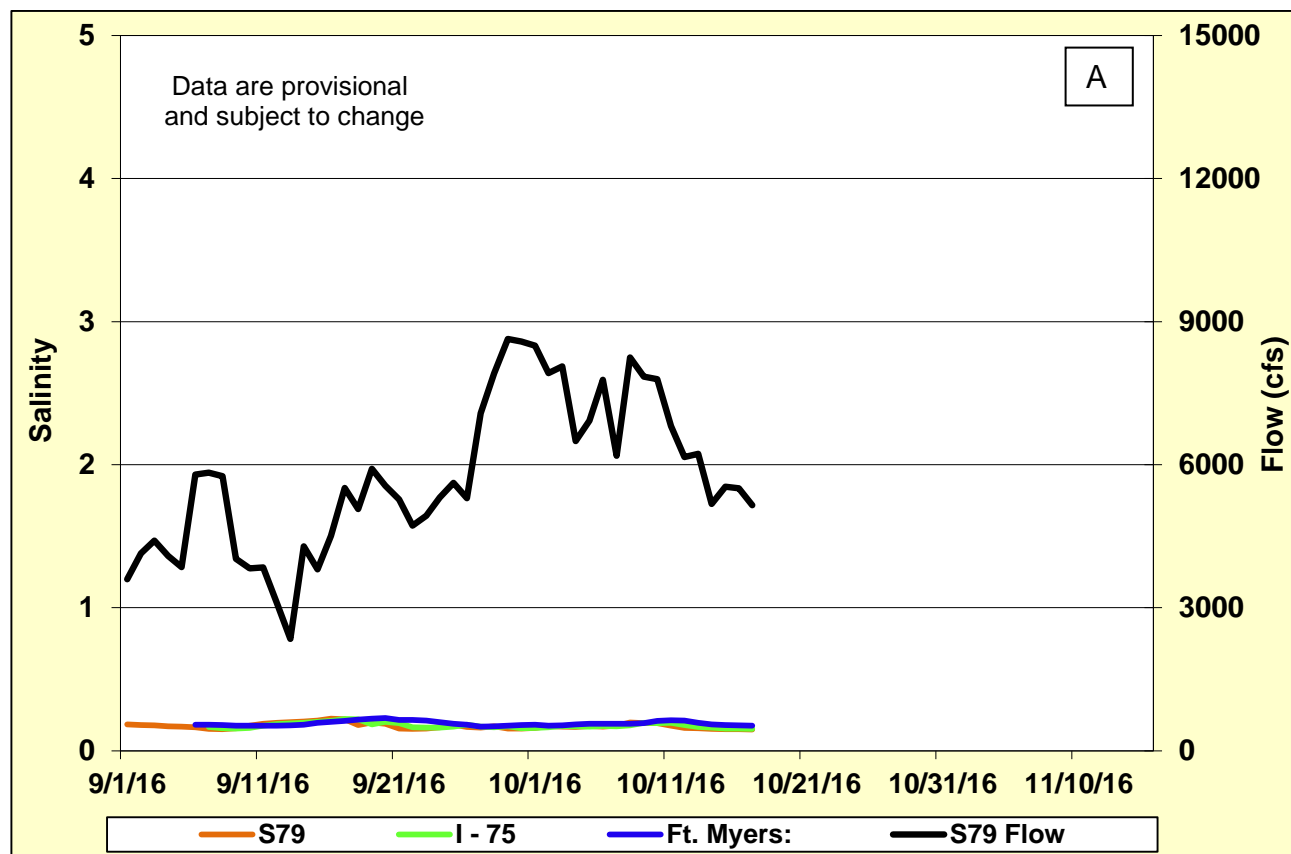


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

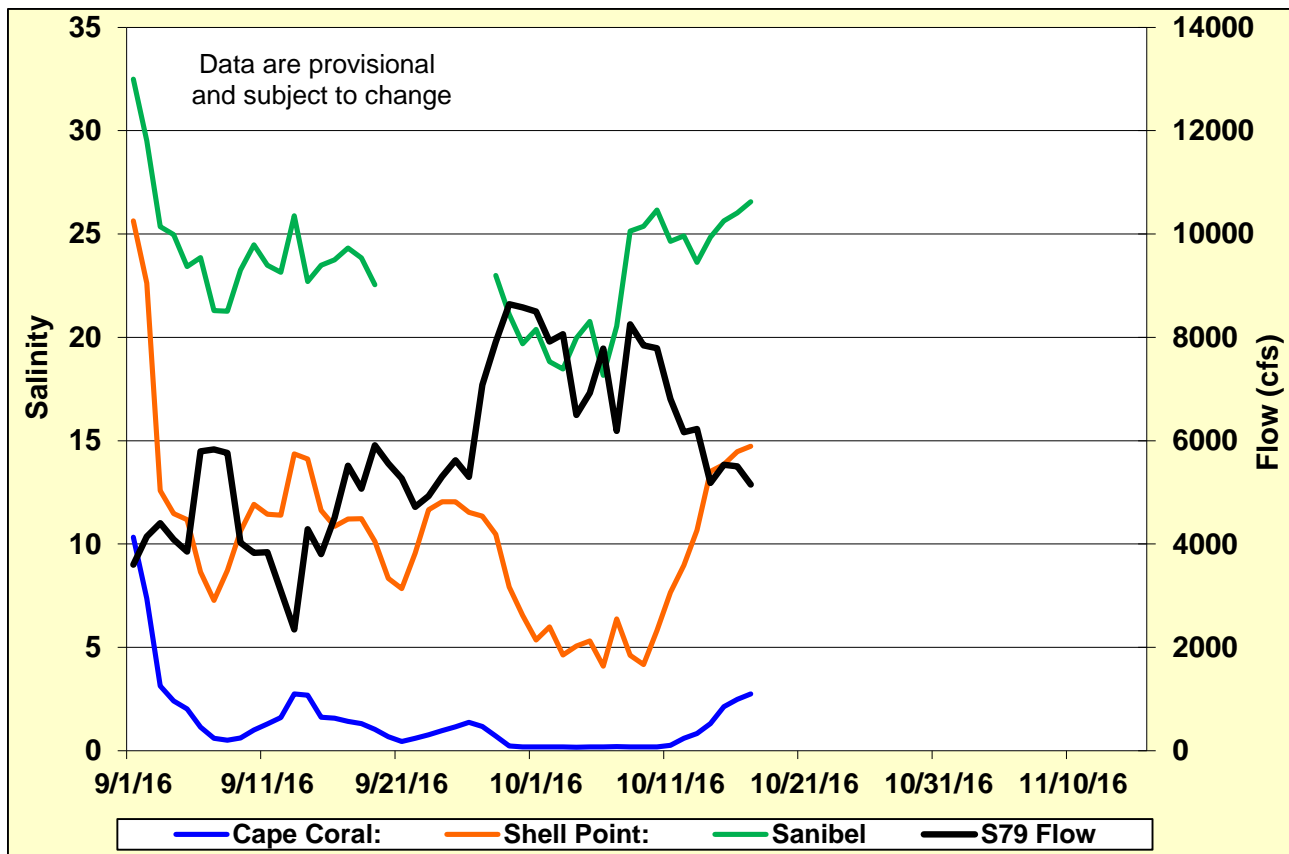


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

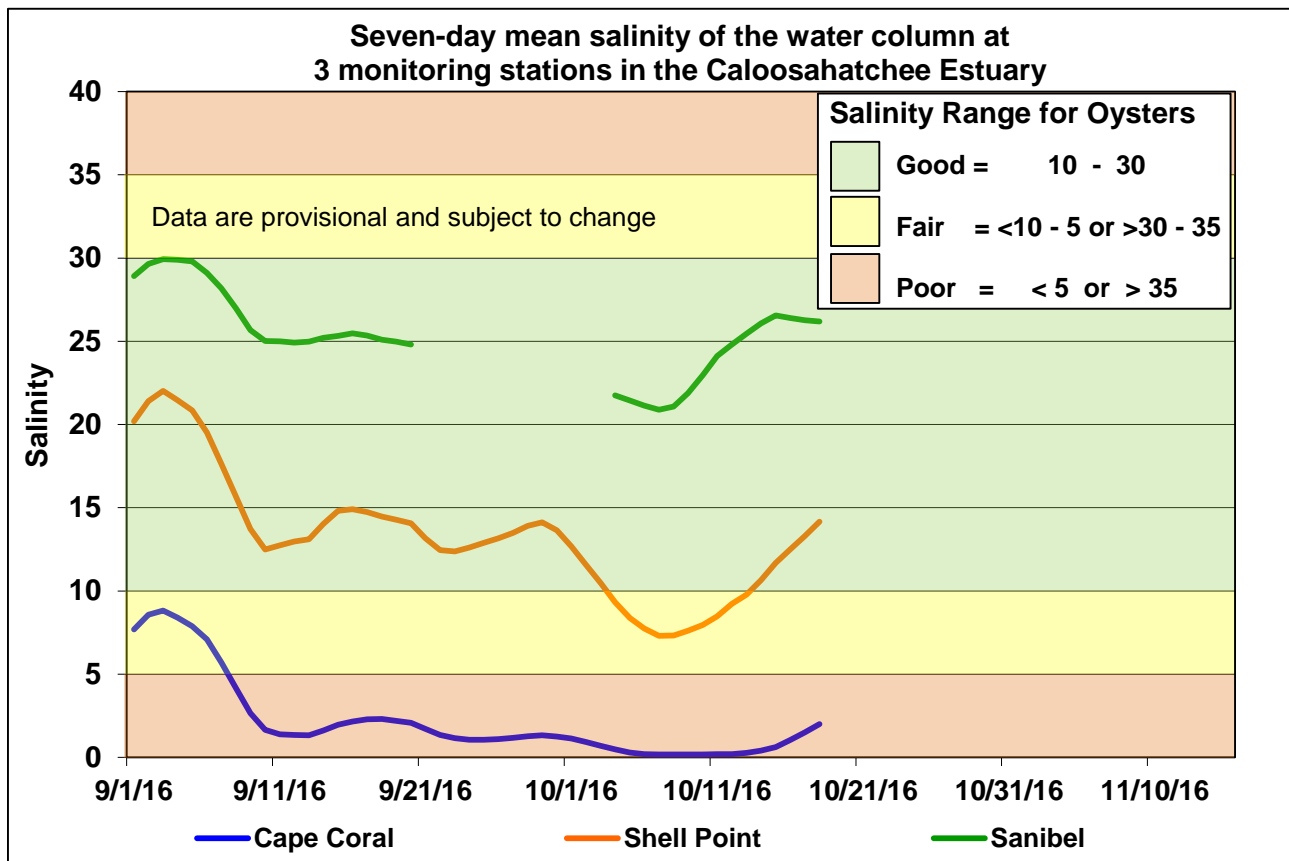
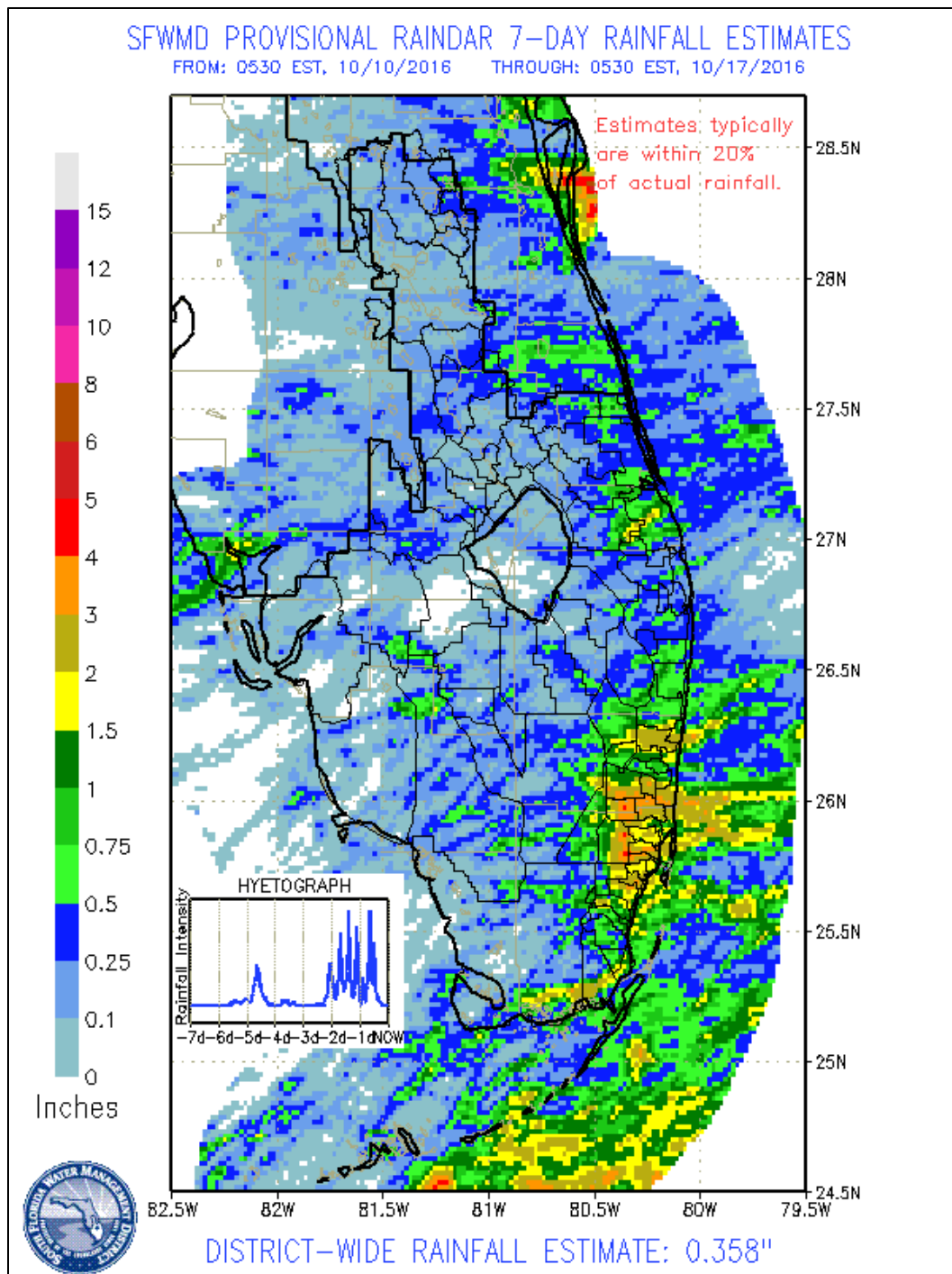


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

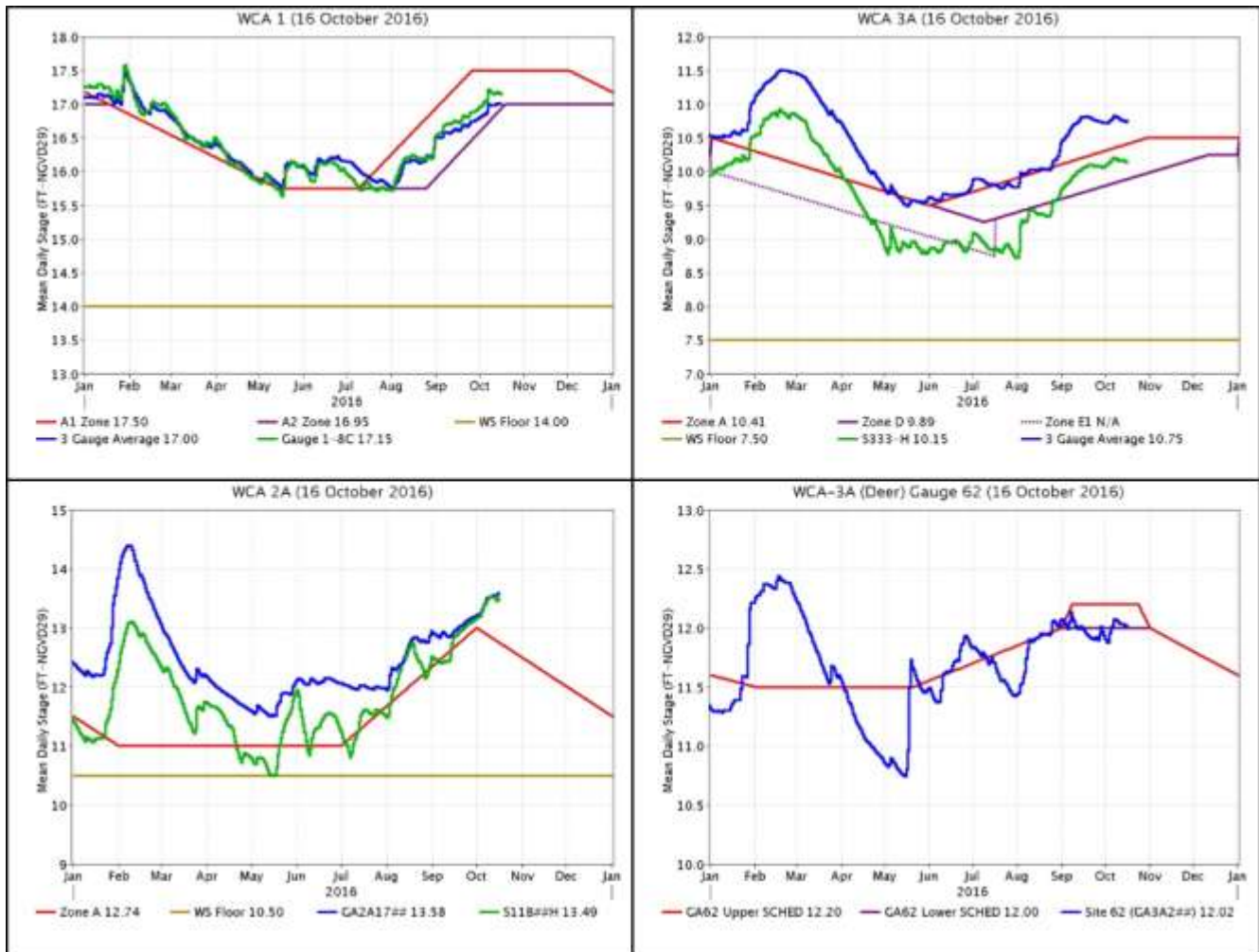
## **GREATER EVERGLADES**

Rainfall was lower this week than last with basin averages ranging from 0.31 to 1.18 inches. The highest maximum local rainfall was three inches within Everglades National Park (ENP), which is half of last week's maximum. Pan evaporation was 1.49 inches, which is higher than the pre-project average of 1.12 inches.

<b>Everglades Region</b>	<b>Rainfall (Inches)</b>	<b>Stage Change (feet)</b>
WCA-1	0.39	0.02
WCA-2A	0.77	0.07
WCA-2B	1.18	-0.07
WCA-3A	0.34	-0.03
WCA-3B	0.89	0.02
ENP	0.31	-0.07

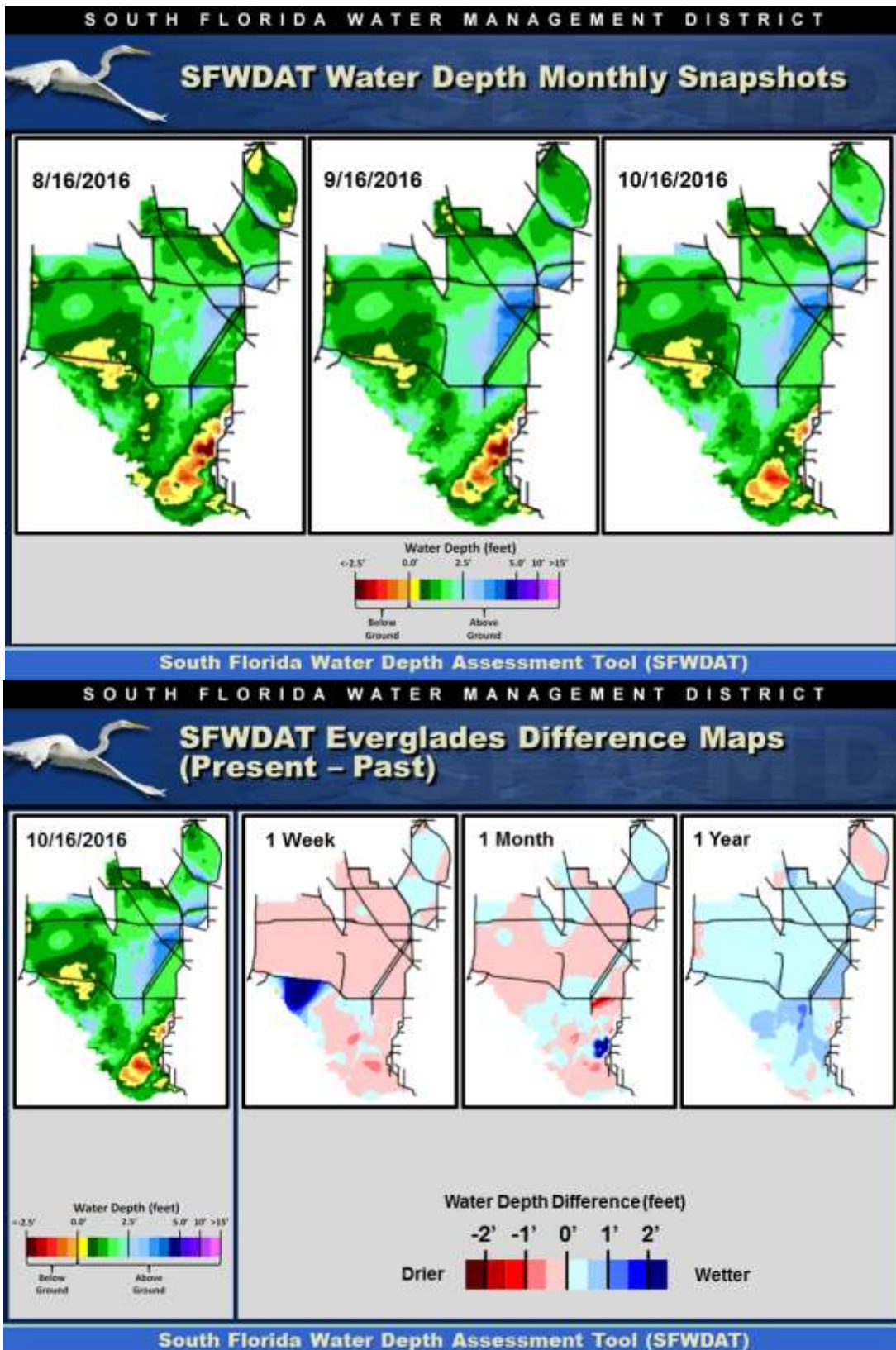


Regulation Schedules: Stages are still above regulation for two of the four areas. The WCA-1 three-gauge average is -0.50 feet below zone A1 and 0.05 feet above zone A2, and the northwestern WCA-3A gauge stage (gauge 62) is -0.18 feet below the upper schedule and 0.02 feet above the lower schedule. The other two areas remain above schedule: WCA-2A stage is 0.84 feet above regulation (which is decreasing at this time of year) and the WCA-3A three-gauge average stage is 0.34 feet above regulation.



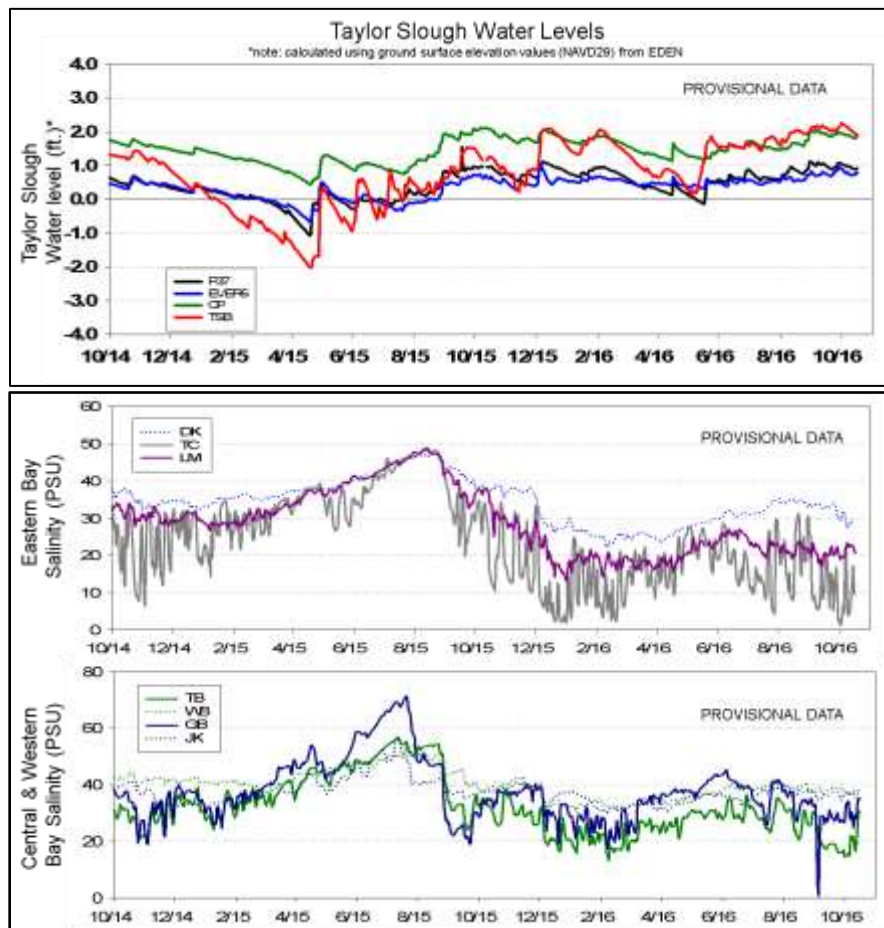
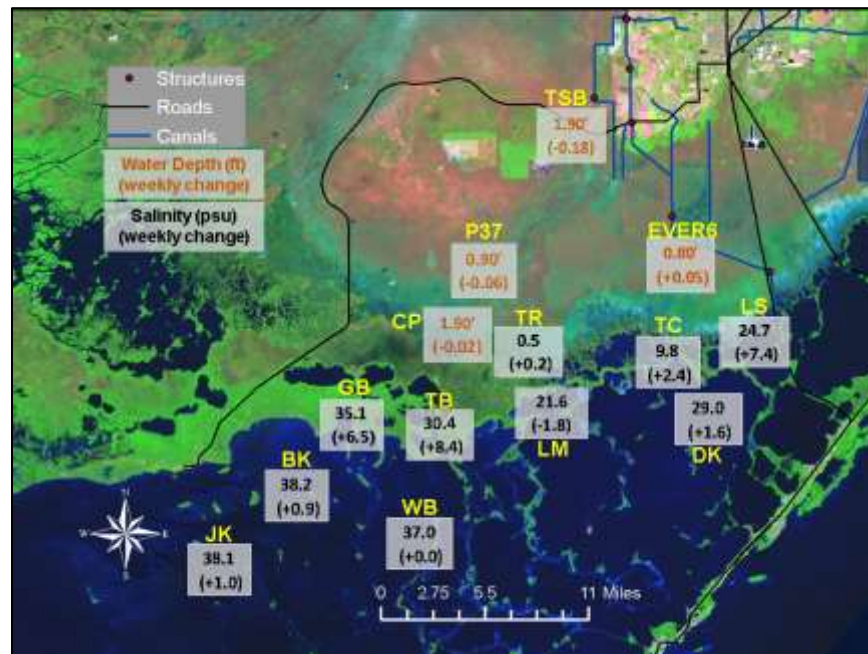
**Water Depths and Changes:** Water levels in WCA-1 and -2A are higher than those in September and August while the other areas are mixed in comparison. There was an adjustment in the calculation for the area just north of northern Taylor River. Water depths at monitored gauges other than in WCA-2B range from 1.59 feet to 2.86 feet. The two-gauge average for northern WCA-3A is 11.61 feet.

Stage changes were mixed again last week with most areas decreasing, but WCA-1 and -2A increased. Individual gauge changes ranged from -0.08 feet (WCA-2B) to 0.07 feet (WCA-2A). Stages are mixed when compared to a month ago but are mostly wetter than a year ago. The large monthly increase just north of Taylor Slough is due to the change in calculation.



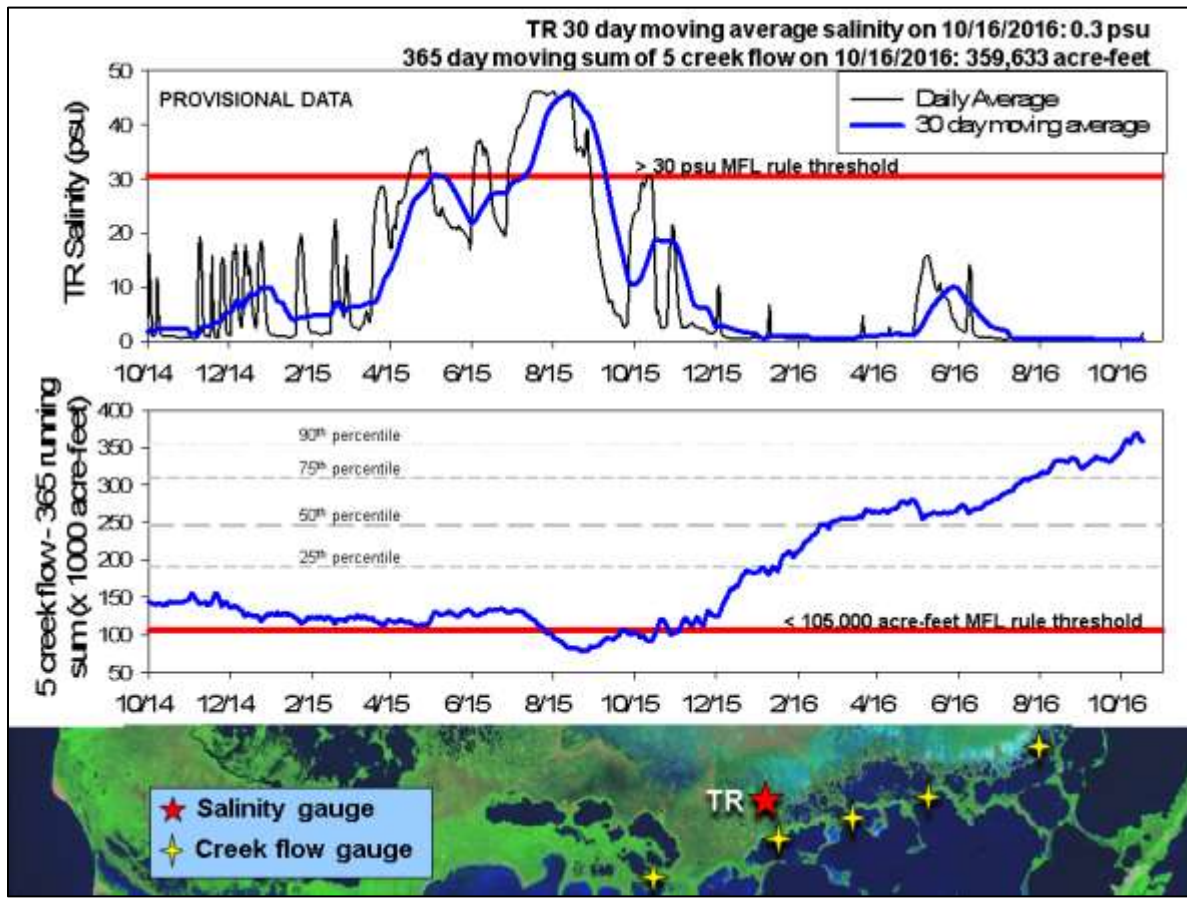
Taylor Slough and Florida Bay: Water levels were decreasing this past week in Taylor Slough, but the ENP panhandle region received nearly two inches in rainfall and increased slightly. All areas are still average to four inches above average with northern Taylor Slough being the furthest from average.

Salinities in Florida Bay increased in most areas with the largest increase in the central nearshore embayments. Daily average salinities now range from 10 to 38 psu with the highest salinity now in western Florida Bay.



## Florida Bay MFL:

The MFL sentinel site TR in the mangrove zone remains near fresh at 0.5 psu, and the 30-day moving average salinity at TR is also at a seasonal 0.3 psu. The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay increased about 8,000 acre-feet this past week to 359,633 acre-feet (above the average of 257,628 acre-feet). The western-most creek has experienced negative flows since Wednesday. Creek flow is provisional data from the USGS and is highly variable.



## Water Management Recommendations

- Water levels in WCA-3A and WCA-2A should be lowered. Closures initiated by FWC in the WCAs are still in effect due to high water levels and expectation of continued high water.
- The depth at gauge 65 (southern WCA-3A) is at 2.86 feet and has been above 2.5 feet for a seventh consecutive week. We recommend that water depths in southern WCA-3A should be reduced and remain below 2.5 feet throughout the wet season to protect tree island forests that were inundated for over 20 weeks in the dry season.
- Ascension rates need to remain under 0.25 feet per week to protect habitat and wildlife, including apple snails, prey of the endangered snail kite.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

## Everglades Ecological Recommendations, Oct. 18th, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
<b>WCA-1</b>	Stages changed -0.01' to +0.06'	Rainfall, ET, management	Limit ascension rates to a maximum of 0.25 ft/week.	Ascension rates of <0.25/week will protect habitat and wildlife including reproducing apple snails.
<b>WCA-2A</b>	Stages rose 0.07'	Rainfall, ET, management	Maintain ascension rates <0.25 ft/week. FWC has initiated closures to protect wildlife due to high water levels.	Ascension rates of <0.25/week will protect habitat and wildlife including reproducing apple snails, prey for endangered snail kites.
<b>WCA-2B</b>	Stages fell -0.07' to -0.08'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25/week will protect habitat and wildlife including reproducing apple snails.
<b>WCA-3A NE</b>	Stage fell -0.02'	Rainfall, ET, management	Reduce stages in northern WCA-3A. FWC has initiated closures to protect wildlife due to high water levels. Ascension rates should be limited to the extent possible of <0.25 ft/week.	Closures may eliminate deer hunting and possibly hunting of other species. They will also eliminate access to tree islands in WCAs -3A and 2A. Ascension rates not exceeding 0.25/week will protect habitat and wildlife including reproducing apple snails.
<b>WCA-3A NW</b>	Stage fell -0.02'	Rainfall, ET, management		
<b>Central WCA-3A S</b>	Stage fell -0.05'	Rainfall, ET, management	Lower water depth at gauge 65. Slow the ascension rates to the extent possible with a maximum of 0.25 ft/week. When flows are changed a gradual reduction is recommended (stepping down over several days). FWC has initiated closures to protect wildlife due to high water levels.	Water depths at gauge 65 should remain below 2.5 feet over this upcoming wet season. Keeping depths below 2.5' at gauge 65 is important to allow tree island vegetation to recover from stress of the recent extended inundation duration. Ascension rates of <0.25/week will protect habitat and wildlife including reproducing apple snails.
<b>Southern WCA-3A S</b>	Stage fell -0.04'	Rainfall, ET, management		
<b>WCA-3B</b>	Stages changed -0.01' to +0.06'	Rainfall, ET, management	Limit ascension rates to extent possible with a maximum of 0.25 ft/week.	Ascension rates of <0.25/week will protect habitat and wildlife including reproducing apple snails.
<b>ENP-SRS</b>	Stage fell -0.07'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTF rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
<b>ENP-CSSS habitats</b>	S-12A and S-12B have been opened.	Rainfall, ET, management	Follow rainfall plan for releases. Gradual reduction in flows through S333, and the S-12 structures when they decrease is recommended (stepping down over several days). Follow guidance in C-111 western spreader canal project operations manual.	Sparrows have ceased breeding for 2016. Future operations need to continue to provide appropriate hydrological and habitat conditions for breeding in subpopulation A.
<b>Taylor Slough</b>	Average to 4 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
<b>FB- Salinity</b>	Average to 13 psu above average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.